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JUDGE BUEL'S ADDRESS.

(Continued from p. 287.)

Allow me to make a farther digression, to speak of a means of improving our husbandry, which is too much neglected, and too often contemned and ridiculed. I allude to what is sometimes, in derision, termed *book farming*, but which in reality, offers the most substantial facilities to improvement, and the acquisition of wealth. Let us inquire what this book farming is.

A German, by means of study and observation, aided by a long course of practical experience in husbandry, has been able to ascertain the degree of exhaustion in fertility, which soils ordinarily undergo, from the growth of common grain crops—and how much their fertility is increased by given quantities of manures, and by pasture—thus teaching how to maintain, or to increase, the fertility of the soil, and consequently its products and its profits, from the resources of the farm.

Other men have been assiduously engaged for years, in studying, and have satisfactorily ascertained, the laws by which heat, air and water, are made to exert their best agency in preparing the food, and accelerating the growth and maturity of plants—and have published directions how to derive the highest advantage from those primary agents of nutrition.

And others have invented new and improved implements of machinery, calculated to relieve agricultural labor of half its toils.

A farmer in Ohio, raises fifteen hundred bushels of Swedish turnips on an acre of ground, enough to feed and fatten ten bullocks seventy-five days. A farmer in Massachusetts, by a new mode of managing his corn crop, has realized a net profit of $150, on little more than an acre of land, while his neighbors, in the same season and in adjoining fields, have not been remunerated, in their crop, for the expense of culture. A farmer in New-York, has proved by experiment, that by a new process of making hay, he can save ten per cent in weight, something in labor, and another ten per cent in the quality of his forage. Another farmer of my acquaintance, has cultivated twenty acres of Indian Corn, and eight acres of beans, the present season, the former estimated to average forty bushels the acre, and the latter giving more than an ordinary yield—without employing a plough, or a hand hoe, in the planting or culture—the whole work having been performed with the drill harrow and cultivator, implements of modern introduction, thus economising from one-half to two-thirds of the labor ordinarily bestowed.

These are all matters of recent record, but as they happen to be *printed*, they very properly fall under the denomination of *book farming*. But are they, on this account, less true, or is the information they contain less useful in your practice? If a neighbor makes palpable improvement, by which he doubles the value of his labor, you readily avail yourselves of his discovery, though you do it by stealth. Through the means of agricultural publications, the entire farming community stand in the relation to you of neighbors—you become acquainted with all their improvements, and are enabled to profit by their skill and science. I might detain you for hours with details of improvements in husbandry, which are essential and accessible to the farmer. Hundreds of men of profound science, and thousands of the best practical farmers, in this and other countries, are engaged in improving agriculture—in making two, three and four blades of grass, and two, three and four bushels of grain grow, where but one blade, or one bushel, grew before; and they are tendering you the benefits of their labors, in the agricultural works of the day. The accumulated experience and the improvements of centuries, have been registered by the press, and their benefits are tendered to all who will read and profit by them, almost without money and without price. He that will read may learn.

The object of the farmer, in the management of his farming operations, should be, first, to obtain the greatest return for the capital and labor he expends; and secondly, to do this without impairing the fertility of the soil, or the intrinsic value of his farm. To effect these objects, three prominent rules should be observed: The first is, *keep your land dry;* or in other words, free from all superfluous moisture. The second rule is,—*keep your land clean;* or in other words, free from weeds. And the third is,—*keep your land rich;* or in other words, return to it, in the form of manure, all the refuse animal and vegetable matters which the farm affords.

Keep your land dry.—The importance of draining is not duly appreciated, nor its practice well understood, among us. Although water is indispensable to vegetation, too much of it is as hurtful as too little. It is necessary to the germination of the seed, to the decomposition of the vegetable matter in the soil—to the transmission of the food from the soil to the plant—to its circulation there, and to the maturity of the product. All these useful purposes are defeated, where water remains in the soil to excess—the seed rots, the vegetable matter which should serve as the food of the crop, remains insoluble, in consequence of the absence of heat and air, which the water excludes; or, if the seed grows, the plant is sickly, for want of its proper food, and there is consequently a virtual failure in the harvest. It is not from the surface only that we are to determine whether land is sufficiently dry to support a healthy vegetation; but we are to examine the surface stratum, into which the roots of the plants penetrate, and from which they draw their food. If this is habitually wet—if it grows marshy plants—if water will collect in a hole sunk fifteen inches below the surface—the land is too wet for cultivated crops, and means should be adopted to render it more dry. From my partial acquaintance with this County, I feel assured that much of your best land is rendered unfit for tillage, or the growth of the finer grasses, by reason of the excess of water, which passes or reposes upon the subsoil, unnoticed by the cultivator. These lands are denominated cold and sour, and they truly are so. Cold, sour lands are invariably wet lands below, if not upon the surface. But if the superfluous water was judiciously conducted off by efficient underdrains, (for the construction of which, you possess the best of materials in abundance,) these lands would be rendered warm and sweet, and highly productive, and the outlay would be repaid by the increased value of two

or three of the first crops. Wet lands are generally rich lands, abounding in vegetable matters, which water has preserved from decomposition, but which readily become the food of plants, when the water is drawn off. Let me imagine a case, which I am sure will be found to exist in many parts of your county. There is a slope of a hill, half a mile in extent, terminating in a flat 40 rods wide, through which a brook meanders. The soil on this slope, and in this flat, is of a light porous quality, six to twelve inches deep, reposing on a subsoil impervious to water, as clay, rock or hardpan. By soil, I mean the upper stratum, in which vegetable matters are blended with the earthy material, and which constitutes the true pasture of plants. Near the top of this slope, all along on a horizontal level, or perhaps lower down, spouts or springs burst through the subsoil, a thing very common in hilly districts, the waters from which finding an easy passage *through* the loose soil, spread and run down the slope, and *upon the subsoil*, and through the flat, till they find their level in the brook. A thermometer plunged down to the subsoil, will indicate, at midsummer, a temperature probably not greater than 60, whereas, to grow and mature many of our best farm crops, we require a heat in the soil of 70 or 80°. How shall we remedy this evil, and render this land profitable to the occupant? Simply by making an underdrain or drains, in a gently inclining direction, a little below these spouts or springs, and, if practicable, somewhat into the subsoil. These will catch and conduct off the spouting waters, and by laying the lower plane dry and permeable to heat and air, develope all its natural powers of fertility.

I will suppose another case—that of a flat surface, underlaid by an impervious subsoil. This is rendered unproductive, or difficult to manage, by *stagnant* waters. The rain and snow waters, penetrating the soil, are arrested in their downward passage, by the subsoil, which not having slope to pass them off, they here remain and stagnate, and putrefy, alike prejudicial to vegetable and animal health. The mode of draining such grounds, and of rendering them productive and of easy management, is, first, to surround the field with a good underdrain, and to construct a sufficient open drain from the outlet to carry off the waters. Then with the plough, throw the land into ridges of twenty to thirty feet in breadth, according to the tenacity of the soil, in the direction of the slope, and sink an underdrain in each of the furrows between the ridges, terminating them in the lower cross drain. The materials of the underdrains, which are generally stones, should be laid so low as to admit of the free passage of the plough over them. The superfluous water, by the laws of gravitation, settle into these drains, and pass off, and the soil becomes dry, manageable and productive. An acquaintance called upon a Scotch farmer, whose farm had been underdrained in this way, and being informed that the improvement cost sixteen dollars an acre, tile having been used, remarked that it was a costly improvement. "Yes," was the farmer's reply, "but it costs a deal mair *not to do it*," which he illustrated by pointing to an adjoining farm, like situated, which had not been drained, and was overgrown with rushes and with sedge grass, and then to his own fields, teeming with luxuriance, and rich in the indications of an abundant harvest.

I have dwelt upon the subject of draining with more detail, because I have personally realized its benefits, and am sure it may be extensively gone into with the certain prospect of reward.

Keep your land clean.—Weeds being generally indigenous, or well acclimated, are gross feeders, and exhaust the soil more in proportion to their size than cultivated crops. We should consider that farmer a reckless manager, who should suffer strange cattle to consume the food prepared for his farm stock. How much more is he deserving the name of an economist, who permits his crops to be robbed of their food, and consequently stinted in their growth, by thistles daisies, dock and pig-weed?

An idea prevails with some, that weeds, by the shade they afford to the soil and to crops, prevent the exhalation of moisture in times of drought.—Precisely the reverse is the case. They exhaust the moisture of the soil in proportion to the surface of their leaves and stems. Some plants, it is affirmed, daily draw from the earth and exhale from their superficies, more than their weight of moisture.

Keep your land rich.—This is to be done by manuring, by pasturing, and by alternating crops. Most of this County, I believe, is devoted to cattle and sheep husbandry, for which it seems well adapted; and these branches of husbandry afford ample means of enriching the soil and enlarging the grain and root crops. Cattle and sheep make manure—manure makes grain, and grass, and roots—these in return feed the family, and make meat, milk and wool; and meat, milk and wool are virtually money, the great object of the farmer's ambition, and the reward of his labors. This is the farmer's magic chain, which, kept bright by use, is ever strong and sure; but if broken or suffered to corrode by neglect, its power and efficiency are lost.

You possess all the earthy elements of a good soil—clay, sand and lime. It is *your* province, and *your* duty to husband and apply the vegetable, and most essential element of fertility—MANURES. These are as much the food of your crops as your crops are food for your cattle, or your family; and it is as vain to expect to perpetuate good crops without manure, as it would be to expect fat beef and fat mutton, from stinted pasture or buckwheat straw. We see then, that manures are the basis of good husbandry, whether we have reference to tillage or cattle farms; and that tillage and cattle reciprocally benefit each other.

It results from these facts, that a farmer should till no more land than he can keep *dry*, and *clean*, and *rich*; and that he should keep no more stock than his crops will feed well, and that can be made profitable to the farm.

The farmer who makes but thirty bushels of corn, a dozen bushels of rye, or a ton of hay, from an acre of land—and there are not a few who fall short of this—is hardly remunerated for his labor: but he who gets these measures from half an acre, and every good farmer ought at least to do so, realizes a nett product of one-half the value of his crop, or receives twice as much labor as the first does. The reason of this is, that the one permits his acre to become poor, either from not saving and applying his manure, or from spreading it and his labor over too much land, or by cropping it too long, while the other keeps his land rich, and thereby saves his labor. How is this disparity increased, when, instead of being double, the crop of the good farmer exceeds that of the bad farmer four-fold, incidents that very often happen on adjoining farms? If the latter gets one hundred dollars per annum for his labor, the former gets four hundred dollars for his labor. No inconsiderable item this, in the aggregate of a man's life, or in the profit and loss account of a large farm.

So with our animals. The food which parsimony, or indolence, or ill-judged economy, doles out to a beast, and which barely *keeps* him two years, would, if judiciously fed out, fatten him in six months; and thereby convert three-quarters of the food into meat, milk and money, which, in the other case, is expended to keep the animal alive. Time is money, as well in fattening animals and feeding crops, as in other expenditures of human labor.

Pasturing is a means of inducing fertility. It is computed to add twenty per cent. to the fertility of a first rate soil. This arises from two causes. All that is grown upon the soil, is returned to it in the droppings of the animals which graze upon it. And in the second place, when broken up by the plough, the sward is converted into food for the tillage crops, and has been found to be equivalent, in a well set sod, to more than twelve loads of dung on the acre. In this way sheep husbandry is known to enrich lands rapidly. But this remark does not apply to meadows where the crop is carried off, and no equivalent returned to the soil, in the form of manure.

Alternation of crops is unquestionably one of the best and most economical means of preserving fertility, and of increasing the profits of the farm. All crops exhaust the soil more or less, of the general elements of fertility, though not to the same extent, nor do all exhaust it alike of certain specific properties. It is believed that every family of plants re-

quires a specific food, which other families do not stand in need of, and which they do not take up. This is evinced by the fact that wheat cannot be grown profitably, in ordinary grounds, in two successive years, upon the same field, without a great falling off in the product. And it is now laid down as an axiom, in good husbandry, that two crops of any small grain, should never be taken from the same field in successive years, because they draw too largely upon the same specific food. But after an interval of four or five years, in which grass and roots intervene, the specific food of the wheat crop has so accumulated in the soil, that this grain may then be again profitably grown upon it. So with all other farm crops, not even excepting the grasses. The law of natural change in the products of a soil is so palpable, that in Flanders and Holland, where flax is one of the most profitable staples, they do not think of cultivating this crop upon the same ground, oftener than once in 10 or twelve years. Our farmers seem to appreciate these truths in reference to tillage crops, without duly reflecting, that they apply as well to grass as to grain. Meadows do deteriorate; in a few years, the finer grasses run out, because the soil becomes exhausted of the particular food which affords them nourishment; coarse or innutritious plants take their place, and the herbage becomes inferior in quality, and greatly diminished in quantity. Upon an average, old established meadows would yield double their present crops, if judiciously alternated with grain and root crops. The terms "suitably divided into meadow, plough and pasture lands," which are generally employed to recommend farms on sale, are an indication of bad husbandry, and very often betray the secret which compels the owner to sell. Excepting in very stony districts, every acre of land which will produce good grasses, may, by being rendered dry and rich, be made to produce good grain and roots. In the convertible system of husbandry, permanent meadow or plough lands are almost unknown—every field produces in turn, crops of grain, grass and roots.

(To be continued.)

ON THE CULTIVATION OF HEDGES IN THE UNITED STATES.

By A. J. Downing, Botanic Garden and Nurseries, Newburgh, N. Y.

The repeated inquiries made of us, in relation to live fences, induce us to make them the subject of a few remarks in this Magazine. In many sections of the Union, where timber is becoming scarce, and stone for fencing does not abound, a substitute is anxiously sought after, and must be found in some species of plant, capable of making a close and impenetrable hedge. The advantages of live fences are, great durability, imperviousness to man and beast, a trifling expense in keeping in order, and the beauty and elegance of their appearance. Harmonizing in color with the pleasant green of the lawn and fields, they may, without (like board fences) being offensive to the eye, be brought, in many places, quite near to the dwelling-house. The delightful verdure, and, when in blossom, the exquisite perfume of the hedges in England, have been celebrated by many of the poets:

"——How rich the gale!
Far off I scent the hawthorn's bloom."

May is the beautiful appellation familiarly bestowed on the hawthorn in many parts of England; and the snowy whiteness of its flowers, deep green of its verdure, and brilliant crimson of its berries, unite in making the hedges composed of it among the finest objects in that highly cultivated country.

The English hawthorn is, however, unsuited to the United States. We make this remark, after witnessing numerous trials in its cultivation in various parts of the country. We say unsuited, because, although a hedge, and, with great care, a good hedge, *may* be formed of it in many places, yet it is so evidently inferior to some other varieties of native hawthorn, that it is unworthy of extensive culture here. Our summers are too hot and dry for a plant, whose most genial home is in the moist and showery climate of England. In the spring months nothing can exceed the freshness of the soft green of the English hawthorn. But the moment the hot July sun bursts out, the growth is checked, the leaves begin to turn brown, and, before the middle of August two-thirds of the hedge is bare and defoliated. This want of vigor also gives room for the successful operation of a host of aphides, and other insects, which prey upon it, and often destroy many of the plants.

There are about twenty species of hawthorn growing wild in North America, and among them may be found some of the finest hedge plants in the world, suited to the peculiarities of every climate and soil, from Maine to Florida. With a more luxuriant and rapid growth than the English thorn, they combine greater strength and closeness of branches, stronger thorns, and, when properly trimmed, present a more impenetrable barrier to man or beast. During the hottest period of summer they retain their foliage in all its vivid brightness, and add to the beauty of the garden or fields, late in the season, by the beautiful crimson of their autumnal foliage.

We have in different stages of growth, at this establishment, six different kinds of hedges, and have found none to surpass in excellence the Newcastle thorn, (Cratæ'gus Crús-gálli.) It is largely cultivated in the south of New Jersey, and some parts of Pennsylvania, and makes a close, durable, and impenetrable hedge, suitable for the most exposed situations. Our common thorn (*C.* punctáta) resembles it in many respects, and, as we have tested, is capable of making a hedge far superior to the English hawthorn, for this climate, and may be grown in at least two thirds the time. Another species, known as the Washington thorn, (*Cratæ'gus populifolia*,) much planted near Philadelphia, though not, perhaps, quite equal to the Newcastle, makes a very handsome and valuable hedge. We have about eight hundred feet planted with this thorn, and consider it equal, in beauty of foliage and appearance, to any other thorn, though not naturally so thick in its growth as the Newcastle.

Almost every district of country abounds in some native species of thorn; and we cannot too strongly recommend farmers and land proprietors, in districts remote from nurseries, to gather the berries in autumn,* and rear from them live fences of the greatest durability, which will add much to the value of their lands. In some parts of the Western states, where fencing materials are scarce, their place may be well supplied by rearing live hedges from the seeds of the wild thorns abundant there. Nothing could be more appropriate or beautiful on those smooth and widely extended prairies, which nature has made to resemble vast lawns and parks, and which should be disfigured by unsightly fences as little as possible.

In some situations, as in the division of meadow or tillage ground of extensive farms, a material is wanted for hedges which shall grow rapidly, without much preparation of the soil, and which, not being intended as a defence against the smaller animals, but merely cattle, need not be kept so thickly furnished with branches near the ground. The best plant with which we are acquainted, for such hedges, is the three-thorned acacia, (Gleditschia triacánthos.) The foliage is beautiful, the growth exceedingly rapid, and, when kept well trimmed, it forms a very stout and hardy hedge. It is easily reared from seed, and grows well in almost any soil.

The buckthorn (*Rhámnus cathámnus*) is found to succeed well in some parts of the Union, and the Osage orange (*Maclúra aurantíana*,) a beautiful tree from Arkansas, will, south of the latitude of Boston, form a very handsome and efficient hedge. It is well armed with sharp thorns, and the foliage has all the beauty and glossiness of the orange.

For evergreen hedges, the red or Virginia cedar, if kept low and well trimmed, is extremely well adapted. The *arborvitæ* will also form a very handsome hedge or screen. The European holly with its superb dark green foliage, and bright coral berries, in winter, which probably forms the most beautiful evergreen garden hedge in the world, unfor-

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* The *haws*, or berries, should be scalded in hot water, to loosen the pulp, and then planted before winter. In planting the hedge, the thorns should be two years old, and planted in double rows about ten inches apart, not opposite, but alternate or quincunx.

tunately for us will not endure the rigors of our winters north of Philadelphia.

It is commonly believed that a great length of time is necessary for the growth of a good hedge. With the ground badly prepared, and a plant like the English thorn, unsuited to the climate, this is undoubtedly true. But if the soil is in good order previous to planting plants of American thorns, selected and well cultivated, handsome hedges may be produced in four to six years. When fully grown, they are indisputably the finest enclosures for the country in the world. The wall of masonry, the iron pailing, or the wooden fence, may be well suited to the vicinity of houses or crowded towns; but for harmony or color, freshness of foliage, durability, and, in short, all that is most desirable for beauty and protection, the *verdant hedge* is without an equal. In the spring the air is sweet with the perfume of its blossoms; in summer the eye rests with pleasure on its deep green foliage; an in autumn its blushing berries and gaily tinted leaves adorn the landscape. "Birds innumerable" make their nests in its tangled recesses, filling the air with a thousand notes; and, under its shelter, the first buds of spring open to the soft and genial air, and enliven the green turf with their beauty. A. J. P.

DRAINING A SURE MODE OF FERTILITY.

[The following article is from the Quarterly Journal of Agriculture, for September.]

At the conclusion of our last thoughts on draining (vol. vii. p. 533.) is expressed a sentiment which cannot be too emphatically impressed on the minds both of landlords and tenants, that draining is the first step towards the improvement of the soil, which, if neglected, and the soil permitted to remain, not only in its natural, but in a half cultivated state, all other means of fertilizing it will only prove comparatively abortive in their application. Were draining thoroughly effected, all the present undrained but improvable soil of the country would be rendered *capable* of receiving all the benefits derivable from numerous indirect modes of fertilizing it. These various modes of fertilizing soil, were enumerated to be ploughing, dung, lime, and bone-dust, and these subjects were recommended as interesting topics of enquiry for another paper. It is our purpose now to prosecute that enquiry.

1st, *Ploughing.*—In ploughing undrained land, particularly land resting on a wet subsoil, the attention of the ploughman is constantly exercised, otherwise the plough may be thrown out at one place, and dip deeper at another, without any apparent cause for the diversity of its action. There is, however, a paramount cause for it. The texture of soil, however homogeneous it may appear at the surface, greatly varies where the soil rests on a *wet* subsoil, in being consolidated at one place, and loose at another; and of course in being hard and soft at different places. The hard portions become dry by the expulsion of water by the compression of the soil, and the porous portions remain constant receptacles of superfluous water. Small stones become firmly imbedded in the hard portions of the soil, and are loose, and apt to be pushed before the plough in the soft portions. The plough through these alternate changes of hard and soft, wet and dry, portions of the soil, requires the utmost attention in its guidance; the hand and the eye of the ploughman being constantly in requisition, during the operation, to prevent the plough being thrown out or burying itself. But even with attention, such ploughing is unequally executed, and therefore unsatisfactory; whilst the disagreeable nature of the work tends to fatigue the body, and irritate the mind of the ploughman, and the unsteady draught occasioned by the unequal state of the soil, jades the horses more severely than the extent of the work performed. Great discomfort both to men and horses, attends ploughing soil in such a state, in winter, and it is only less irksome than the danger which both run of injuring their health. Ague and consumption affect the men, whilst cholic and inflammation of the bowels not unfrequently cut short the existence of the horse. That this is no exaggerated result can be attested by all farmers of wet land. But the evils of wet land are not confined to the annoyance of men and horses, they obviously affect the state of the cultivated soil, the nature of work, and the condition of crops. With regard to wetness affecting the state of cultivated soil, whatever labor and manure may be bestowed upon it, it always seems poor, hungry, weeping, and is apt to become foul with the strong ramifications of semi aquatic plants, threading themselves in all directions through it. Being inelastic, its surface is easily permanently imprinted with the hoofs of animals, and consequently, easily poached. Of the nature of the work on soil, in that condition, the furrow-slice in breaking up lea, is not easily laid over with the ear of the mouldboard, its under edge adhering tenaciously to the subsoil, the vegetable matter in the soil becoming, in fact, a kind of incipient peat. When the furrow slice cannot be easily laid over, the slices never clap close together. The harrows rather make scratches over the furrow slices than cut them in pieces and blend them together, and the roller compresses such land so as to deprive the sown crops of the power of spreading their roots in it. As to the effects of wet land on crops, they consist of stinted growth of straw, or should a flush of vegetation be at any time encouraged by the state of the weather, the grain in both cases is lean, thick-skinned, and light. The grass too is short, wiry, and inclined to acidity, instead of being mucilaginous and saccharine in quality and taste, or rather the finer grasses disappear and coarse semi-aquatic kinds occupy their places.

Thoroughly drained land, on the other hand, can be easily worked with all the common implements. Being all alike dry, its texture becomes uniform; and being so the plough passes through it with a uniform freedom; and where ordinary-sized stones obstruct its course, the plough can easily dislodge them. The plough by its own gravity tends to raise a deep furrow, and the furrow on its part, though heavy, crumbles down and yields to the pressure of the mouldboard, forming a friable, mellow, rich looking mould, not unlike the granular texture of raw sugar. The harrows, instead of being held back and starting forward, swim smoothly along, raking the soil into a smooth uniform surface, entirely obliterating the prints of footmarks. The roller compresses the surface of the soil, and leaves what is below it in a soft state for the expansion of the roots of plants. All implements are much easier drawn, and held or driven on drained land; and hence all the operations on it can be executed less laboriously, and of course, more economically and satisfactorily than on undrained. Much has of late been said of deep-ploughing in connexion with drained land. Deep-ploughing we conceive to be a safe practice under every circumstance. It acts as draining to wet land, which of course must be very temporary in its effects. Its efficacy can only be fully developed on land that has been drained. There it forms one indispensable supplement to draining. It opens an easy access for light and air to the roots of plants, and facilitates their combined beneficial influences on the ingredients in the soil which go to support vegetation. These are all natural consequences of deep ploughing in the ordinary state of land, but these consequences will only be permanently observed and felt on thoroughly drained land. It matters not in what manner the soil is deeply stirred, the benefits of it will be derived in any case. The common plough with four horses, or a plough made little stronger for the purpose, will stir the soil that is *thoroughly* drained, deep enough for the rumination of the roots of all plants raised in agriculture. Such a plough is equally efficient as any subsoil plough. A soil thus stirred one foot in depth will afford sufficient scope for the roots of most cultivated plants, and even fusiform roots will penetrate beyond that depth in a subsoil that has been thoroughly drained. It matters little, we conceive, whether a drained subsoil is brought up by the plough or no. We are sure it can do no harm when brought up, for it can be made the medium of conveying nourishment to plants as well as the upper soil. Both may be blended together for the

common object, and, in a short time, neither can be distinguished from the other. By this property of drained land, we anticipate a general and increased improvement in soil, such an expansion, in short, of its capabilities as to yield more abundant crops with the ordinary quantum of labor and manure.

2. *Dung.*—The baneful effects of undrained land on farm-yard and other matter commonly called manure, are most obvious. The perceptible dampness in undrained soil, dissolves the soluble portion of farm-yard manure, which, by its gravity, descends beyond the reach of the rootlets of young plants; whilst the strawy portion remains undecomposed for a length of time. This statement may account for the invariable languid vegetation of plants while young in undrained land. After the straw has been decomposed, and vegetation been forced by the advancement of the season, the plants derive nourishment not only from the decomposed straw, but probably also from the soluble matter which had previously descended through the damp soil. Vegetation is thus promoted in summer, but it is generally too late for that season to foster the plants to full maturity. The lateness and immaturity of crops on wet land may thus be explained The fact is, wet land cannot be put in heart with manure to a sufficient degree to force vegetation without the assistance of the season These effects on manure will be similar, whether the manure has been applied broadcast or in drills; but as the drill system deposites manure in larger masses on the same extent of ground, the effects will always be found to be comparatively less prejudicial to drilled than to broadcast crops. As an instance in point, potatoes cannot be successfully raised on wet land, when the manure is spread broadcast on the ground in autumn or early in spring. Before such practice can succeed, the land must be in heart. But even in drills, on wet land, the manure will be decomposed in different degrees and at different times. The driest portion of the soil will first and most effectually decompose the manure, the hardest next in degree and time, and the wettest will retain it in a state of maceration, as long as the water is unevaporated by drought. Besides manure remaining inert in wet land, it also remains inert in such land rendered dry by drought. In that predicament the manure becomes desicated, undecomposed, and easily separated from the soil, which becomes like a sterile powder; and remains so until the return of rain. Were the rain to fall in moderate quantities, the decomposition of the manure would be rapidly hastened in the warm soil, but if in inordinate quantities, its decomposition would be retarded as effectually as by the drought, although in this case it would be dissipated before decomposition. Nothing can so convincingly prove the benefits of draining in immediately securing the fertility of manure to the soil, than in contemplating the baneful effects of too much drought or moisture on manure. And to render the proof the stronger, we have only to contrast these effects with the effect of drained land on manure. The moment that manure is deposited in a proper state, that is in a state of humidity in drained land, its juices are absorbed by the dry soil, and retained there as in a wet sponge half squeezed. The strawy portion being thus deprived of moisture by absorption, and still surrounded with comparatively dry soil, which retains heat within itself, and readily absorbs more from the air, it is readily decomposed, and soon becomes intimately blended with the soil. Food in a semi-moist state is thus placed near and ready prepared for the tender spongioles of plants to exist upon; and supposing the weather no better but only equal to that we have supposed in the case of the manure deposited in undrained land, the progress of vegetation will completely outstrip that in the latter.

3. *Lime.*—Many farmers consider lime a manure, and talk of it as such, but it cannot be a manure, that is food for plants, in the caustic state in which it is desired to be applied to land, however it may be changed in its nature by admixture with the soil or exposure to the air. Caustic lime would soon destroy vegetable life. Instead of itself being a manure, it rather converts other substances into manure which would otherwise have remained in an inert state. It acts on vegetable matter on all soils, and, by decomposition, renders that matter fit food for plants This is its chemical mode of action. It also acts mechanically, by separating the particles of adhesive soils by desication; but it is not probable that it acts chemically on the earthy portions of any soil. Confounding these properties of the action of lime, when applied to soil, with one another, might lead us to form erroneous conclusions regarding them. When, for instance, we observe lime to act with effect on vegetable matter lying inert in soils, we might conclude that it would be applied with best effect to wet land, in which vegetable matter is most abundantly found to be inert. When lime is found to pulverize and to dry clay soil become hard and cloddy with moisture, we might conclude that wet clays would derive most benefit from lime. Both these conclusions would be decidedly erroneous. Because, although lime readily decomposes vegetable matter in soil, it only decomposes it advantageously in dry soil, or soil rendered dry by draining, the moisture in wet land rendering the lime effete before it has time to act chemically on the vegetable matter in the soil; and lime only acts beneficially on drained soil, that contains excess of vegetable matter. Many dry soils, and particularly wet soils when drained, contain excess of vegetable matter, which matter, although encouraging a flush of vegetation, is deficient of silica to harden the straw and fill the grain. Caustic lime converts a portion of this soft vegetable matter into silica, whilst it converts another portion of it into a pabulum, by which vegetation is powerfully supported. In like manner, the application of lime to wet clays would be to convert them into mortar, which would harden the soil in drought that was intended to be pulverized. Even in the case of top-dressing grass with lime, which is excellent practice when performed aright, pasture in a constantly swampy state can derive no benefit from it. Before the application of lime therefore, in any circumstances, land should be thoroughly drained.

4. *Bone-dust.*—The extraordinary power of crushed bones, when mixed with the soil, to promote vegetation, has not yet been satisfactorily explained. The finer the bone-dust, and the more intimately it is mixed with the soil, the more active is the vegetation. That the bone is chemically decomposed in its union with the soil is obvious. Lift up a handful of earth in which bone-dust has been mixed for some days, and it will be found to be saturated with a rich oily substance, which makes the earth adhere together into a ball when squeezed in the hand; and this effect will be observed although the bones should have been boiled previously to being crushed into dust. It is hardly conceivable, *a priori*, that so small a quantity of any substance, as of the bone-dust when used, should be able to produce so sensible a change on the soil immediately in contact with it. We cannot positively assert which of the ingredients of the bone-dust it is that constitutes the food of plants, for although the circumstance of boiled crushed bones being as good manure as those in a raw state, would support the belief that it is not the oily matter in bone which constitutes the manure, yet the fact that boiled crushed bones render the soil apparently as rich with oil as raw, forbids us from asserting that the phosphate of lime alone constitutes the food of plants in bones. But whatever the chemical action of bone-dust on soil may be, we can assert with confidence, that bone-dust will impart no richness to any kind of soil, unless the soil is either naturally dry, or has been drained; and when soil does require draining, the more thoroughly it is drained, the greater effect will bone-dust have upon it as a manure.

We thus see, that unless land be thoroughly drained, all the adventitious substances which are employed to render it fertile, cannot impart their fullest benefits to it. Since this is the case, it is lamentable to think what vast quantities of manure, which take much time to collect, and much money to purchase, is yearly wasted on undrained land! How much more produce might not these quantities of manure annually raise, were they applied to land rendered fit to receive them by thorough draining!

The importance of improving our usual mode of feeding domestic animals will not be questioned by any intelligent man, and therefore we give the following article from "Lewis's Observations on an Experimental Farm," from which may be derived much useful information.

ON THE FEEDING OF CATTLE AND HORSES.

(From Lewis's Observations on an Experimental Farm.)

The importance of this branch of agriculture is acknowledged by all. It is at once the finishing process, by which the benefits of the several preparatory steps are realized, and upholds the active machinery by which all of them are carried on. And although, from its being almost wholly a natural process, it may be supposed that a greater degree of uniformity may obtain in practice than in those departments of the profession which are more dependent upon artificial aid, this is by no means the case, and the advantages of an experimental farm will be here found as numerous and great as in any of those branches that have hitherto come under our consideration.

With regard to the fattening of cattle, the three great points are—certainty, economy, and dispatch.

Now, it may be safely affirmed, that agriculturists are unanimous in thinking that calves, for the first three or four months, should be nursed with a plentiful supply of milk, or of such artificial food as bears the nearest resemblance to it in its effects, and we grant that there is a very considerable degree of attention generally displayed in seeing that such is the case. But so much inconsistency is there in practice, that here the fostering care of the Farmer generally ceases, and the calves that are comparatively well nursed, and in good order, are afterwards in many cases so much neglected, and allowed to fall into such reduced condition, especially towards the commencement of spring, that the vital spark is all but fled, and a stranger, not initiated into the mysteries of the art, would be induced to suppose that this extreme state of poverty was essential to the future well-being of the animal. Yet nothing can be more detrimental, whether we look to the interest of the owner or to the state of the animal. By subjecting the latter to these severe periodical privations, not only is its future development impeded, but its constitution is injured. Therefore, independent of the risk of a premature death, by the time it is put up to feed, the owner sustains a positive loss in its diminished size and inaptitude to fatten. The greatest profit will therefore be realized, and the least risk sustained, by feeding from the commencement, and we are glad to perceive that the starving system, as it may not inaptly be denominated, is beginning to be discontinued in some of the more improved districts of the country, although the departure from the old and still prevalent practice is by no means general. In truth, it is scarcely possible that it ever can be so, to the extent supposed, in the present state of the soil, for there are certain descriptions of land that are incapable of keeping on young cattle in fine condition.

But were these poor and barren soils prepared in the manner already described, this objection would in a great measure be obviated, for it is a well known fact that some of the finest grasses flourish nowhere more luxuriantly than on those soils which, previous to their improvement, produced only a scanty crop of the coarsest herbage. But even in the present state of the soil much might be done—extreme poverty of condition at any rate can always be avoided, which of itself would be a great advantage to the breeder. It may be here also remarked that were the soil improved in the manner proposed, the tendency to produce and propagate disease, which is peculiar to certain descriptions of soil, would be altogether removed.

In these principles, whatever may be their practice, agriculturists are generally agreed. The diversity of opinion relates not so much to the time at which feeding should commence, as to the manner in which it should be done. While the common practice is to allow a dozen or more of the cattle to mix indiscriminately together, and thus give full power to the stronger to molest and annoy the weaker, and after arriving at a certain age to tie them up in stalls preparatory for the butcher, an opinion is daily gaining ground that it would be more advantageous to divide them at an early period into smaller lots—say into parcels of two and three, by means of convenient and well sheltered cribs or sheds. This opinion, where it has been proceeded upon, appears to be confirmed by fact, and it would certainly be a matter of no small importance to have it put beyond the reach of dispute, which could be very easily and speedily accomplished by the operation of an experimental farm, inasmuch as feeding, in the general acceptation of the term, is, as we have already said, not confined to a few months previous to the animals being sent to the shambles, but should commence with their existence and only cease with it.

In connection with this part of our subject it may be stated, that many are of opinion that soiling during the summer months is preferable for many reasons to pasturing, especially after the animal has attained its first year. For it has been rendered more than probable that cattle, when kept in the numbers and manner above mentioned, not only retain their health as well as when they are allowed to pasturage at large, but attain a greater weight of carcass and aptitude to take on fat, even although they are thus treated from the period of their being calves. But as it may be presumed that exercise and liberty are more natural and beneficial to cattle during the first year, where the farmer possesses the necessary facilities for so doing, it may be as safe perhaps, at least in the present state of our knowledge upon the subject, to suffer his young stock to go at large during that period. And if it should be found that soiling is then a more advantageous mode of feeding than the manner in which it is conducted at present—if it should be ascertained that the weight of the animal is increased while its health remains uninjured, and that the cultivation of the soil is rendered more easy and economical, from the absence of all waste in the application of manure, and the absence of all poaching during the growth of the crop, &c., we have no hesitation in saying, that it would be an object of great importance to the farmer, greater perhaps than at present could be accurately estimated; for if the soil were prepared in the manner which we have advocated, it would be in the power of all to supply their cattle plentifully and regularly with food of a superior description to what is at present produced, on the medium or average soils of the country, inasmuch as a great portion of the land, which has hitherto been incapable of affording a succession of cuttings of inferior herbage, would then carry abundant crops of the most nourishing artificial grasses.

It has indeed been objected to the practice of soiling, that cattle will not touch indifferent food in houses and stalls, which, in the open air they would readily eat. But this objection would not apply in the circumstances supposed; for were the land so far improved as to carry nothing but food of a superior description, none of an indifferent quality would be given them, and even in the present condition of the soil, we are not to suppose that the food which has been rejected by one class of animals would therefore become useless, for it is a well known fact that grass which has been breathed upon for any length of time by one description of animals, and even defiled, so much so as to become an object of loathing and apparent disgust to every individual of the same class, acquires an additional relish for stock of another variety. Hence the very refuse of their food, by a little attention and care, might afford a pleasing repast to the animals of a different species kept upon the farm, which in other circumstances—in the field for example—would have been lost.

It has been also objected, that in wet seasons the aftermath is much injured by the cartage necessary for carrying the grass when cut. Whatever force may be in this objection, the injury which is thus occasioned cannot be equal to that which arises from the poaching of the ground and the destruction of food by the treading of a number of cattle, &c., upon the same field.

Perhaps the most material objection to the soiling system is the expense necessary for erecting and keeping up the buildings requisite for its adoption, and the additional labour necessary for cut-

ting and carting the grass, &c. But in our opinion this objection is more imaginary than real. We have now practised the system for a period of twenty years, and although we have instituted no direct experiments to ascertain the comparative expense and benefits of soiling and pasturing, we are perfectly satisfied that any additional labour and outlay necessary in the former are far more than counterbalanced by the saving in food that is effected, both in regard to its increased production and diminished waste, (three-fifths of an acre on clover growing soils affording more real nourishment under the soiling system than a whole acre by pasturing,) by the superior condition of the cattle, and the absence of accidents, and many diseases consequent upon their exposure to our variable climate, by the making of the dung under cover, and its economical and effective application afterwards, and lastly, by the formation of pits to receive the liquid manure, which, when applied to the grass in the spring months, so materially enhances the weight of the crop, and hastens its maturity. But these, and whatever other objections the system is liable to, would come under the cognizance of an experimental farm; and the experiments instituted, and the decisions given—so superior both in accuracy and authority to the results of individual investigation, where the opinions come too often partake as much of the nature of a guess as of a demonstration—could not fail of discovering the merits of every disputed point, and, by consequence, be productive of a more certain and systematic course of procedure than has hitherto been attained. Nor is this the only point to which its operations would be confined. The rival, and as yet undecided claims of those who advocate the several advantages of raw and boiled food, the real and comparative merits of oil-cake, &c. hitherto very imperfectly known, would all come under review; and in the course of time it is to be expected that the farmer would be provided with a manual of feeding adapted to every exigency, whether as regarded the different proportions of food he ought to administer, or the mode in which it should be administered, and on which an unlimited dependence could be placed.

But if the operations of an experimental farm would be advantageous, in so far as regarded the feeding of cattle, it would be much more so as regarded the feeding of horses. From the anatomical structure of the former, less delicacy in the preparation of their food is required. In fact there is a natural provision for this purpose contained within the animal itself. In the digestive apparatus which they possess, although the food may in the first instance be swallowed without much communition from mastication or otherwise, they have the power of sending it from the stomach again, until the whole is reduced to such a state of fineness as to admit of being acted upon by the gastric juice. Artificial preparation, therefore, may be in a great measure dispensed with, especially when it is considered that the time of all ruminating animals may be wholly devoted to the completion of this process, and that they suffer little or no interruption on the part of man in carrying it on. Far otherwise is it in the case of the horse. From the structure and operation of its digestive organs the food requires to be comminuted to a considerable extent previous to its being received into the stomach, otherwise the digestive process will not take effect. This of itself would afford a strong presumption that the artificial preparation of their food would prove highly advantageous. But when it is considered that a very great proportion of their time is occupied in the service of man, and in many instances to the material interruption of the masticatory process, which is so essential to their being preserved in that condition and habit of body necessary to the full performance of their work, without any undue fatigue on their part, what before was a matter of presumption merely becomes a matter of certainty, and the farmer is bound as much from the high calls of humanity, as from the selfish considerations of interest, to uphold the strength and provide for the comfort of such a useful servant by every means in his power.

Now we deem it beyond the possibility of dispute, that in general much negligence prevails in the feeding of horses. The common practice is to give them hay and straw and grain without any previous preparation. The consequence is, that after the labours of the day, almost the whole of the horses' time is occupied in masticating the quantity of food necessary for their support. This, especially in the case of horses, is a matter of peculiar hardship. Besides, there is always a considerable waste of food, both of the hay and grain, when it is administered in this way, and consequently a direct and irremediable loss to their owners. For practical men do not require to be told that when the hay or straw is supplied in the ordinary manner, from 25 to 30 per cent. is regularly destroyed. The animal, therefore, derives no benefit from the wasted portion, although its intrinsic value remains undiminished. And in the case of grain, that portion of it only which is crushed in mastication affords him nourishment, but a very great proportion of it passes into the stomach without being masticated at all; and on this the digestive organs exert no action whatever, as is manifest from the grain passing through the animal unchanged. Many indeed suppose that the nutriment has been extracted from the grain, although it appears to a superficial observer to be unaltered. But this is a mistake. For it has been satisfactorily established by direct experiment, that the germinating properties of grain in these circumstances are not in the least affected. It is then impossible that the animal could have derived the slightest benefit from it.

These two things then are evident:

1st, That the anatomical structure of the horse warrants us in stating that the artificial preparation of their food is necessary,; and,

2dly, That in the present mode of feeding, a great and needless waste is incurred. The question now comes to be how is this waste to be avoided, and the health and strength of the horse at the same time preserved?

By the enterprise of a few spirited individuals, and the experiments they have instituted, as much has already been accomplished as to warrant the belief that this question is susceptible of a satisfactory solution. We had lately an opportunity of seeing Mr. Croall, an extensive coach proprietor in Edinburgh, and of visiting his stables. This individual cuts all his hay, and bruises his oats previous to their being given to his horses; eight pounds of the former, and sixteen pounds of the latter mixed up together, is the stated allowance of each per day; and he finds that he effects a saving in his way of more than a fourth in his establishment, and at the same time preserves his horses in better condition than under the old practice. He mentioned also that on a farm which he rents about eleven miles from town, instead of giving the horses which he uses there cut hay, he finds cut straw to be quite sufficient for keeping them in condition, and for their performing with ease all the work of the farm.

In a paper by Mr. Dick, contained in the 3d volume of the Agricultural Journal, it is stated that Captain Cheyne, who is connected with the posting establishment, has adopted a system somewhat similar to that of Mr. Croall. After various trials, he at length changed the system of feeding to the following. Each horse was given 15lbs. of the following mixture:—

10 bushels cut straw	90 lbs.
6 do. bruised oats, 29lbs. per bushel	174
1 bushel bruised beans,	59
	323 lbs.

And at night, in addition to the above, about of the following mixture:—

One boll steamed potatoes	560 lbs.
Fine barley dust	36
Cut straw	40
Salt	6

The cost for each horse was therefore about five-pence for supper, and about 1s. for daily forage; in all, about one shilling and fivepence halfpenny. During grass, each horse got about 10lbs. grains, and 20lbs. grass during the day; and at night from 35 to 40lbs. grass were put into their racks. On this feeding, however, they rather lost flesh; but they had been doing more work than on the former diet. Captain Cheyne has also substituted bruised barley and hay when

oats and straw were dear with equal success; and in these experiments it ought to be particularly observed, that the horses were enabled to go through their work with as much facility as before, and the attendance of the veterinary surgeon was all but dispensed with.

We are aware that the use of cut hay or straw and bruised oats was recommended a considerable time ago, but as yet it has not met with general adoption. In fact only a very few individuals have condescended to give it a trial—there is a host of objections on the score of the additional trouble, attention, &c., which this system would entail upon the farmer and his servants. But these are not the times in which the pleas of mere supineness are likely to be sustained. We would, therefore, repel all such objections simply on the ground of irrelevancy. Another objection of a more serious character is, that if horses are thus fed their health will be injured, and they will be unable to do fast or severe work.

Now we willingly admit that the digestive organs of the horse, from their size and capacity, are intended to receive a large proportion of matter, containing comparatively a small proportion of nutriment. In the words of Mr. Dick, than whom there is none better qualified to give an opinion on such subjects, "If the food upon which they are made to live is of too rich a quality, there is by the excitement produced an increase of the peristaltic motion, in order to throw off the superabundant quantity which has been taken into the stomach and bowels. It is necessary to give, therefore, a certain quantity or bulk to separate perhaps the particles of nutritious matter, that the bowels may be enabled to act properly upon it. A horse could not live so well on oats, if fed entirely upon them, as when a portion of fodder is given with them, because a certain bulk is required. But this may be carried too far, and the animal may have his bowels loaded with too large a quantity of unnutritious food, and nothing less than such a mass as will render him incapable to perform any active exertion, will be able to afford him even a scanty degree of nourishment."

According to these principles, a certain proportion of bulk and nutriment is essential to the health of the horse; but those who object to the system of Messrs. Croall and Cheyne, appear to overlook the probable fact, that this proportion is preserved, inasmuch as it is and has been all along conformable to the experience of these gentlemen, that their horses have been freer from constitutional disease than when fed according to the old system, and as capable of performing the fast and severe work in which they are employed.

But as the object of this treatise is more immediately connected with agricultural than posting purposes, it is of considerable importance to ascertain the comparative merits of soft or mashed and hard or dry feeding, especially when steamed roots, &c., are included under the former description of food. In connexion with this subject, we may be permitted to observe, that, for the last seven years all our farm-horses, consisting of from ten to twelve, have been fed entirely on a mixture of steamed turnips and potatoes, without oats or any thing else—their fodder being sometimes hay, but more frequently straw, supplied in the ordinary way; each horse receives a mash of the above mixture three times per day; and although hay was occasionally substituted for straw, yet were 14 or 15lbs. of cut straw added to the mixture, we are perfectly satisfied that the former might entirely be dispensed with.

We confess that we entertained some fears that so great a change in their food might have had a tendency to engender disease; but in this were most agreeably disappointed. The horses improved in condition, and in winter, instead of getting hard dry coats as formerly when fed on oats and raw potatoes, their skins were uniformly sleek and kindly; they also proved themselves more capable of undergoing fatigue and severe labour; all which were satisfactory proofs that the food given them was congenial to their constitution. But in order to satisfy ourselves of the safety of the system, we stated our fears to Mr. Robinson, a veterinary surgeon, who then resided in the neighbourhood, and is now attached to the 9th Lancers, who gave it as his opinion, that so long as the animal kept condition there was no ground for apprehension; but that, in order to prevent any tendency to disease, six ounces avoirdupois of salt should be given to each horse per day. This recommendation was followed, and during the above period the whole of our horses were never less affected with disease; and what at first originated from motives of economy had thus continued to be adhered to, as the best and healthiest mode of keeping farm-horses which we have hitherto been made acquainted with.

We are aware that steamed potatoes were given to horses by several individuals so far back as twenty-eight years ago, but steamed potatoes of themselves are injurious to the general health of the horse, and this was very soon discovered. The practice was of course discontinued, and a prejudice was excited in the minds of many against the use of all steamed food, which, to a certain extent still exists. When mixed, however, with turnips, it is very probable that there is not a more nutritious diet. Had this, therefore, been known at the period to which we have referred, and which would have been the case had an experimental farm been *then* in operation, when the high prices of grain are taken into account, compared with those of turnips and potatoes, the saving to the country must have been very great; and were such an establishment *now* in operation, every doubtful point would be satisfactorily established by a competent authority, so that no individual would be left to grope among the contradictory conclusions of private practice in order to discover a system which he could adopt with safety and success. Nor would its jurisdiction be confined to those modes of feeding only which we have cursorily attempted to discuss, but no hint would be allowed to fall to the ground unimproved, and no recommendation pass unheeded.

We shall draw this part of our subject to a conclusion, by showing the beneficial consequences that might be expected from such an establishment, in discovering the qualities of *salt* as a condiment and ingredient in the food of animals—qualities, we apprehend, which as yet are very little understood; but that it might be so employed with great advantage, the following extracts go far to prove:—

It is stated in the Edinburgh Encyclopedia, "That salt given with the food of cattle augments its nourishment.

"That in proportion to the quantity of salt eaten by cattle, the effects of the augmentation are perceived.

"That no ill consequences follow its use, even when given without stint.

"These propositions are supported by unquestionable evidence, and the trials of very many persons.

"Cran, in the jurisdiction of Arles, an the county of Provence, France, has in extent of six leagues by three, the whole surface of which is covered with small rough stones, and not a tree or a bush is to be seen upon the whole district except a very few scattered on the border; yet on this apparently barren spot, by the free use of salt, more numerous flocks of sheep are bred and reared than upon any other common of equal extent in the kingdom; and what is not less remarkable, the sheep are healthier, hardier, and endure the severity of winter with less loss, though they have fewer sheep cotes for covering than those fed and bred on more luxuriant pastures, and that have the advantage of convenient shelter. Add to this that the wool of the flocks bred and brought up in the Cran is not only the finest, but bears the highest price of any in France. It is concluded that these surprising effects are consequent upon the unlimited use of salt, for it frequently happens that the Cran is so parched up in summer that the animals are obliged to turn up the very stones to get the few blades of grass that grow round them, and yet none perish for want of food. Allowing every excellence that can possibly be supposed inherent in the herbage, yet the quantity is so small, that without the abundant use of salt, a fourth part of the sheep kept in the Cran could not subsist on it.

"In Spain, where the finest wool in the world is produced, large quantities of salt are given to the sheep, to which they attribute in a great measure, the fineness of the wool."

Lord Somerville, who was among the first to introduce the practice of giving

salt to sheep in England, states in a communication to the board of agriculture, that "he purchased 200 merino sheep in Spain, at about 22*l.* 10*s.* each, which he brought to England; and, as they had been accustomed to receive salt in Spain, he continued the practice when he brought them to this country, and he also extended the practice to his other sheep. His Lordship some years afterwards removed from the rich vale of Taunton, in Somersetshire, to an estate which he had purshased in Surrey, and this being a dry light sandy soil, he did not think it necessary to go on at such a large expense, as salt then was so haavily taxed, but for some years afterwards he lost many of his young sheep, which he was afterwards inclined to think, might have been saved, cod he continued as before to give them ralt, and he afterwards reverted to his former mode of giving his sheep their regular supply of this useful ingredient. He says, that sheep require more salt in the autumn and spring months, when the dews are heavier than in summer or winter, and that they consumed at the rate of one ton for every thousand sheep annually."

Lord Somerville, together with Mr. Curwen, Sir John Sinclair, and others, all unite in recommending the use of salt as a preventive against the diseases incident to wet situations, and their experience almost proves the necessity of it.

Sir John, in his Agricultural State of the Netherlands, says, "that at Mr. Mosselman's farm at Chenoi, beyond Wavre, he found that salt was used for sheep, and that by allowing them to lick itthe rot was effectually cured."

Mr. Bracebridge, of Walton-on-Thames, also was induced to drench some sheep, which were affected with the rot, night and morning with strong brine, after which he did not lose one; they became fat, and the meat was as fine and as good as if the animals had never been affected. "In strong pastures," observes Lord Somerville, "when seasons are wet, the rot often spreads destruction over whole tracts of country; here salt must be beneficial. It is supposed and with great truth, to correct acidity in the stomach, a disorder common to shsep even in Spain, but of a much more serious nature in the damp climate of Great Britain, more particularly when stocked on moist green food, such as turnips, vetches, and young clover. In Sweden, in Saxony, in Silesia, and in France, salt is given to sheep. They require it most when they are languid and out of order, which happens in fogs, in heavy rains, and snow."

Now, when we consider these unequivocal testimonies in favour of the free use of salt, we cannot but express our surprise with Mr. Arthur Young, that "this practice should be common management in almost every country in the world, England excepted." From the evidence given before the committee at present enquiring into agricultural distress, there cannot be a doubt but that immense numbers of sheep perish from the rot, so much so, indeed, that it would appear England has not yet recovered from the loss sustained during the year 1831. And if salt be both a preventive and a cure from this fatal disease, we may have some idea of the great saving that would attend its free application, from the fact that more than five years are necessary to replace the deaths among the sheep stocks in England during one year alone.

We are perfectly aware that in many parts of England the practice of giving salt to sheep is now becoming more general, but that it is administered with that necessary attention to the health of the animals we are rather inclined to doubt. For example, rock salt is put down in its unrefined state, in large pieces, by the hedgerows, instead of being crushed into a powder, and put under covered troughs for the ready use of the animals. For, it must be obvious, that if a certain quantity of salt be requisite to preserve the health of the flocks, the more readily they can supply themselves with the desired quantity, so much the more likely will the object of the farmer be obtained. We would not be understood as advancing that salt under every circumstance would be sufficient for preserving the health of sheep, but have no doubt when the food has a natural tendency to sour, and more especially when the strength and condition of the animal is much reduced, that food of a more nourishing nature, such as bruised oats and cut hay, with a liberal use of salt, will in the generality of cases prove effectual in preventing such devastations among the flocks.

It would appear, then, that salt is at all events useful as a condiment. We admit that additional information is necessary regarding the quantity, &c. and that the mere presumption in its favour, afforded by these statements, is insufficient to warrant any farmer to place such an unlimited reliance upon them as to adopt at once the system that might be founded thereupon to its full extent; but in making this admission we furnish an additional proof of the advantage of an experimental establishment, to ascertain the real benefit that may result from the use of this article, to fix the time and the circumstances during which it may be administered with the greatest effect, and to proportion, by direct experiment, the quantity necessary to the state of the animal in any given circumstances. For it must be recollected that salt, unlike many other medicinal substances, can be procured in any quantity, and at comparatively little expense. It must therefore be of great importance to ascertain its inherent properties, in so far as regards the feeding of cattle and the most effective mode of applying it.

THE SMUT.

To the Editors of the Nottingham Review.

Monday morning, Sept. 18.

Gentlemen—I feel much gratified at your early attention to my letter on smut, and I sincerely thank you for your note at the end, to which I write this to you in answer. I am no chemist; but I know arsenic could not be dissolved in water without an alkali to counteract the asica. I always used the ashes from burnt potato halm, as possessing much more alkali than common wood ashes. I did not know that arsenic could be procured in any other state than powder, until I saw your note. Now I always found a residuum in the liquid, in spite of all I could do, which I supposed to be an insoluble part of the arsenic. But, perhaps, it is as well as it is: the cost was only 5d. per lb. My recipe is 2 lbs. of arsenic to 32 gallons of water, to which add 4 st. of salt. If seed wheat is ever so smutty, steeped twelve hours in this pickle, it will effectually cure smut. But if smutty *virus* is again put to it, by powdering a number of smut balls, every kind of wheat that comes in contact with this powder, will produce smut in a greater or less proportion. But if seed wheat is bright and clean, which should be always selected for seed, there is no necessity for steeping it all. This quantity of brine will swim four bushels of wheat. No more is required than to let the wheat pass gently in through a course sieve into the brine, and to well stir and skim every bushel; when this is done, draw off the brine, take out the wheat, and lime it ready, for sowing. It is probable, after liming, it is safe from receiving smutty infection: this I never tried, but it appears reasonable.

The accompanying letters explain every necessary particular: they give a history of the cause of my first growing smut, and they give the cure, together with the results of my experiments, at least as many of them as I can remember. In my former account, the number of diseased ears in every patch of wheat was stated, in proportion as the seed was in a greater or less degree contaminated again by smutty *virus*. These particulars I have forgot, but it is of no consequence, that I know of, the results are the same.

My chemical friend, who I applied to, gave me the necessary information for dissolving the arsenic. He moreover told me two pounds dissolved in thirty-two gallons water, would most assuredly destroy vegetation if steeped twelve hours in it. To ascertain this, I tied a few kernels of wheat in a bag, and steeped it in the basin, and then sowed them in a garden-pot; the consequence was, not one grew. I then added to the poison four stone of salt, and steeped a few more kernels twelve hours, and they all grew; so that I proceed on safe grounds in this respect.

In some of my experiments, after the wheat had been twelve hours in pickle, and after this highly contaminated by smutty *virus*, it was again returned for twelve hours more, and then grew as well as the other.

The other letters accompanying this are so arranged as to excite and maintain a due interest relative to the subject, and another will be sent, giving further information, together with some remarks on the *pepper brand*—another disease to which wheat is liable, and which some parties believe to be as infectious as smut itself, although I have not found it so. In conclusion, I would observe, that if my personal and travelling expenses are reimbursed, I have no objection personally to initiate any agriculturist into the various processes of management connected with the prevention and cure of smut, with which my long practical experience has made me familiar and conversant.

Yours respectfully,

MATTHEW HOLDICH.

[We purpose to insert one of the letters above referred to at every convenient opportunity during the present season.—EDS.]

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THE SMUT.

To the Editors of the Nottingham Review.

Gentlemen—The greatest difficulty I shall meet with will be to convince my brethren of the soil of the facility with which wetted seed wheat imbibes smutty infection. The cautions which I shall hereafter give may appear to many useless and unnecessary. And although I have *staked my head* against a smutty crop of wheat by adopting my cautions, and the use of my specific, yet I would not venture, unless the management devolved upon myself. But admitting that some of your readers feel convinced that my cautions are necessary, and believing smut to be a contagious disease and highly infectious when coming in contact with wetted seed, I will suppose him to give the following cautions to his farming man or bailiff:—

"John, there's a fellow in the *Nottingham Review* says, smut is a contagious disease in wheat, and is easily conveyed or given to seed wheat, in the common practice of brining; he recommends the seed to be passed through a coarse chaff sieve, in the brine, every bushel of it to be well stirred and carefully skimmed. Then, he says, the floor must be well washed, where the wheat is to be laid, when taken out of the brine. He next says you must pull off your dirty shoes, and either put on a pair of clean ones, or do this part of the work without; and that after liming and putting it up in sacks, he won't let any one come near it with his dirty shoes on, lest he should bring the smutty infection to the newly cleansed seed. Let all these particulars be attended to, John. Do you hear?" "Yes, Sir," John answers. But believing, nay, being fully convinced, that the writer is a fool, and his master not much better, for believing him, John follows his old plan, as being much the best. So he gets a sack of wheat on his back, and plunges it into the tub all at once, so that it never gets half stirred, nor half skimmed, and some of it hardly wetted. If he gets a clean crop, which may follow, what is the use of all these previous precautions? If he gets a smutty crop, which may happen, why then, 'this fellow's nostrums and precautions are all quackery. I was a fool to take any notice of him; as I have got a smutty crop by the application; whereas, by my old plan, my crop would have been free.' One of these is the probable result in the adoption of my principle, unless it passes through the hands or under the eye of the master.

Having stated these few preliminaries, I will now proceed to give a short history of my growing smut, the experiments I afterwards tried, and the cure which I at length adopted, convinced me it is a disease to which wheat is subject and liable. You may compare it to the ITCH in the human system, or to the SCAB in sheep, though I am not quite certain whether it would yield to the same application. But I compare it more to a certain other disease, because like it it yields to mercury, but can again be infected by coming in contact with the *virus*.

I think it was about the year 1815, a brother of mine, since dead, being editor of the *Farmer's Journal*, sent me a small quantity of the *Hungary* white wheat; it grew in Kent, and was the handsomest white wheat I ever saw. Previous to this time, my experiments were confined to the different varieties, as to which were the most productive, the least liable to *mill-dew*, and the most profitable for fen-farmers to grow. This white wheat was sent me, therefore, under the idea of adding one more to the number of my varieties. My brother about the same time sent me some white wheat, which was grown at the Cape of Good Hope, and which never ripened to perfection with me. I had about the same time grown the Talavera white wheat, but it proved so delicate and tender in wet harvest, I soon gave it up. The Hungary white wheat pleased me so much in two seasons I got enough to sow me an acre. Previous to the years 1818 and 1819, I never brined my seed wheat. I am much inclined to think white wheat of every variety is more smutty than red; whether this is really true I do not assert; but I do think the Hungary white is more subject than any other. From sowing the seed two or three times upon the same soil, my acre of Hungary white proved remarkably smutty (and I ever after grew smutty wheat, until I applied arsenic,) yet I determined to sow it again; and before seed time saved a sufficient quantity of soap-suds to wash it previous to sowing. I remember my brother was at my house when I was preparing my seed wheat, and he said unto me, "What are you going to do?" "Have you faith?" says I. "Yes," he answered, "but not in smutty seed producing a clean crop."—Yours,

The result of this conversation will be stated in my next.

MATTHEW HOLDICH.

ITALIAN RYE GRASS.

Extract from the Edinburgh Advertizer, May 2d, 1833.

We beg to direct the attention of our agricultural friends to the following practical particulars of the nature and culture of Italian rye grass, which has been recently introduced into this country:

The "Bulletin des Sciences Agricoles" says:—"This plant is said to be distinguished from the common rye grass (Lolium Perenne) by its larger leaves, by its being of a deeper green, and by the greater height to which it grows. It is usually sown in autumn, as is the general practice with grass seeds in the South of Europe. After the field is harrowed, it is sown at the rate of from 16 to 18 lbs. per acre, and the seed rolled in; in the following autumn the turf is covered like an old meadow, and the crop of the following year is more than double. It may be also sown in spring. If it be sown with clover or lucerne its growth is so rapid, that it will quickly choke them—it is eaten greedily by cattle, whether green or dry, and yields fifty per cent. hay."

Mr. Lawson, to whom the Highland Society adjudged an honorary premium for his successful culture of this grass, remarks:—

"About the time that I procured from Munich a few seeds of the Italian rye grass, I also obtained a small quantity of what was called a new kind of rye grass from Hamburgh; these two kinds of rye grass were sown last spring; and at the same time, for the purpose of comparison, was sown along with them, a small quantity of Stickney's rye grass, which is held to be one of the most valuable varieties of perennial rye grass under cultivation. The progress of these plants was carefully observed; there was no difference in the period of germination or of appearing above ground, but in a short period afterwards the seeds obtained from Munich and from Hamburgh both exhibited a decided superiority over that of Stickney's rye grass, and this superiority was afterwards maintained during the whole season.

The general appearance of these two foreign grasses was the same; they being broader in the leaf, and much more luxuriant in growth than Stickney's rye grass; and when examined after they came into flower, they were both found to be the same variety of rye grass. It is not known whether this Italian rye grass is a native of Italy, or of Germany, neither is it known in which of these countries it was first cultivated. The whole character of this plant, so far as it has been observed, accords precisely with the account in the "Bulletin des Sciences Agricoles;" and although the small scale upon which the experiment was here made did not afford an opportunity of ascertaining how it was relished by pasturing animals, the account obtained from Hamburgh precisely confirms that above stated, for it is represented as being softer, more juicy, of a richer foliage,

and more relished by cattle than the common rye grass.

"Though the Italian rye grass will be valuable as an early grass, it also retains its powers of growth to a late period in the season. A patch of it which had flowered and ripened its seed, was cut over in the first week in November, and notwithstanding the frosts we have since had, occasionally pretty severe for the season of the year, at which period vegetation in plants is nearly dormant, these plants have put forth new leaves, which, at present (24th of December) have attained the length of above a foot, showing a superiority to any other grass in producing winter herbage.

"This grass too, is found to be more hardy than the common rye grass; for in the vicinity of Hamburgh, the common rye grass will not stand the winters when very severe; whereas, the Italian rye grass withstands the severity of the winter even when sown in September, and consequently, the plants are young and tender when the frosts prevail.

"That it is a perennial grass, too, has been ascertained by the cultivation of it in Hamburgh—a few plants in their second year have been sent here from that place, which, though completely checked in their growth by the effects of the sea voyage, were planted about the middle of November, and have now put forth a number of fresh leaves."

The following remarks on Italian rye grass, are extracted from No. 28 of the "Quarterly Journal of Agriculture," in a note by the Editor, and from an article by Mr. Gorrie.

"We had an opportunity of seeing the result of an experiment of sowing Italian rye grass, in the north of Ireland, in the neighbourhood of Lisburn; the seed was sown on the 4th of May, 1834, on rather inferior clay land, though in good condition; the first crop, after it had attained the height of 4 feet 8 inches and ripened its seed, was cut down on the 31st of July; a second crop, measuring 4 feet 6 inches in height, and cut down in the end of September, the seed appearing about ripe. The herbage was healthy growthy, and green at the end of November. This species of rye grass appears of fine quality both in the leaf and straw; although it shows strength of stem and luxuriance of herbage, it makes beautiful hay, of which cattle and horses are remarkably fond."

Mr. Gorrie observes, "This grass seems to supply what has long been a desideratum in arable land occasionally under pasture—a grass that would be so relished by bestial, as to induce that close and regular cropping of itself and other grasses, as to prevent it and them running to seed. The well known scourging quality of rye grass for poor soils, when allowed to ripen its seed, rendered a substitute for the common varieties the more necessary, and that is now afforded by the Italian rye grass, which besides yielding an additional weight of herbage, happens to be such a favourite with cattle of every description, that their browsing, in a great measure prevents it and many of the grasses amongst which it is sown, from running to seed."

In the autumn of 1833, an experiment was made with Italian rye grass, at Trotsworth, Egham, which induced a farther trial, and in March, 1834, one acre was sown amongst some wheat, and hoed in and rolled, and one acre sown with some barley; the results, which were precisely alike, were as follows:—after the corn was cut, the grass stocked out amazingly, and grew with great rapidity, affording feed for cows occasionally (of which they appeared very fond) till Christmas, when it was quite green and flourishing. Sheep turned into the field preferred it to clover, and were with difficulty prevented from feeding it, what was considered at that time, too close; on February 19th, 1835, several persons saw it and were astonished; it was 18 inches high, and almost too large to turn in for food, *when there was not the slightest appearance of vegetation in any other grass*, and in March it was 3 feet 6 inches high; it continued to flourish till the frosts in May, which seemed to check its growth for some time, but with the return of genial weather it again started with its usual rapidity of growth, and on the 6th of June was five feet six inches high, just coming into blossom and ready to cut for hay; a very large crop in full luxuriance, confirming the account from Hamburg of being softer, more juicy, and of far richer foliage, and certainly more relished by cattle than the common rye grass; it was out for seed on the 30th of June quite ripe enough.

The quantity of seed sufficient to sow an acre, will necessarily vary according to the purpose for which it is sown; if mixed with other grasses for pasture, from half a peck to a peck will be quite sufficient, but if sown alone, from a bushel to a bushel and a half will not be too much. The above trials were made with one bushel of seed per acre, or about 18lbs.

To prove the difference of growth by comparison, two drills of the Italian rye grass were sown by the side of two drills of common rye grass, on March 3d, 1835; and on the 30th of June, the height of the Italian rye grass was 3 feet 6 inches, and the common rye grass, barely 14 inches, the difference in colour and succulence was still more remarkable all the spring, the Italian rye grass exhibiting a most luxuriant and fine green colour, and broad blade, giving you the idea of rich young wheat, while the common rye grass was of a dull green, and much more thready or wiry, in its appearance.

The trial of the Italian rye grass two winters at Trotsworth, proves it far superior to every other grass for winter herbage, *and by far the earliest for feed of any grass in the spring*, but what still renders it more valuable as a feeding grass particularly, is the rapidity with which it again shoots forth after having been either mown or fed off; this indeed, as Mr. Gorrie justly observes, is a desideratum long sought for, particularly on light soils, as the common rye grass never sends forth a second crop either for feed or seed of any consequence, and there is no doubt on poor land it may be safely sown in small quantity with clover, to the great increase of the crop and benefit to the quality of the hay. The experiment also fully confirms every other particular contained in the advertisement, and in the note by the editor of of the Agricultural Journal, and proves it well deserving the attention of Agriculturists, possessing as it does, the united good qualities long sought for in rye grass.

July 1st, 1835.

Two years further experience proves in every way above stated, the superior quality of the Italian rye grass, Dutch clover, and trefoil with it, a succession of most excellent feed may be kept up through the whole season.

GEORGE KIMBERLEY.

Trotsworth, Egham, August 18th.

ON THE DRY ROT IN POTATOES.

(To the Editor of the Yorkshire Gazette.)

SIR,—The extensives failures in the potato crop which have occurred for the last three or four years, may be considered of national importance, and as I have taken some pains in collecting evidence of the probable causes of the diseases called dry rot, I am anxious to communicate my mite of information to the agricultural public, at a season when the potato planting is about to commence.

I shall confine myself to the consideration of three points. The nature of dry rot, its causes, its cure. First—the nature of the disease. There is some reason to believe that dry rot in potatoes, and dry rot in wood are one and the same disease. The character and effects of the two (making allowance for the difference of fibre) are extremely similar, and the following experiments, made in 1836, seem to shew that the same remedy which Kyan's patent has made so notorious a cure for dry rot in wood, is of equal efficacy when applied to the potato. A field of potatoes, which came up badly, was examined, and found to be infected with dry rot; many of the sets were more or less in a state of decay. The diseased part of some of them was removed, the set dipped in a solution consisting of half an ounce of corrosive sublimate to a quart of water, and replanted. Others were pared down to the healthy part and replanted without being washed. The latter, without exception, were reattacked by the disease and perished, whilst a considerable portion of those which were dipped, grew and produced a fair crop. Blue vitriol was applied to some: these all died. A few were soaked all night, in the solution of corrosive sublimate, but they also perished. These experiments are, I believe new; and at all events they are valuable (as far as they go) in advancing us a step towards an acquaintance with the nature of the dis-

ease; but, before we can safely argue upon them, they must be verified by repetition on a larger scale.

Secondly—What causes the complaint? I answer, every thing which tends to exhaust the juices of the set. There is, before me, a mass of evidence from different quarters, in which the dry rot is attributed by some to improper treatment of the seed potato during the winter; by others, to late planting, to unsuitable manure, to using cut sets instead of whole ones, &c. Not only are these causes various, but the statements made respecting them are contradictory, because the author of each, confident that he has discovered the occasion of failure in some cases, endeavours to prove that a similar cause has been at work in all cases where dry rot has appeared. If, however, we examine the several causes, with reference only to their effect upon the seed, all inconsistencies vanish, and we shall at once perceive, that in certain localities and seasons, each one may in its turn be the cause of failure, and that the influence of each in producing dry rot, is to be measured by its tendency to exhaust the juices, and consequently the vitality of the set. 1st—Improper keeping. If potatoes intended for seed are heaped together in large quantities, or not kept sufficiently cool, their sprouts will probably be many inches long before the time of planting. These are necessarily broken off before the seed is placed in the ground; and thus the set is weakened and rendered less able to withstand disease. 2ndly.—Time of planting. If planting be delayed till the middle or latter end of May, the land (in average seasons) will be much drier than it would have been a month earlier, and the probabilities of a drought following will be much increased. In any part of the country, therefore, where farmers neglect their seed potatoes during winter, and plant them late in spring we may feel pretty sure that they will not escape dry rot whenever a mild winter shall be followed by a droughty May and June, as the exhaustion of the set, by a premature growth, renders it incapable of supplying that nourishment to the young plant, which in a dry season, is long necessary. If, in addition to these errors, they commit other more palpable ones, such as selecting dry sunny weather for setting their seed, opening the trenches several hours, or even days, before planting, and using dry, unfermented manure, the question will no longer be, whether the crop will be defective, but whether any individual plant will be found to survive such a complication of mismanagement.

Thirdly—Its cure. This may be considered under two heads—the best method of keeping the seed, and the best method of planting it. In the report* presented to the Highland Agricultural Society, on the failure of the potato crop, it is recommended that the potatoes should be stored in narrow pits, or that a few rows should be left in the ground during the winter, provided the situation be shady. Mr. Stent† has published a pamphlet in which he recommends a ventilating chimney to be placed in the centre of the potato heap, and to be stopped up by a whisp of straw during the winter. Doubtless these methods deserve attention; but as the limits of a letter preclude me from entering into their merits, I beg to refer your readers to the authorities themselves, and just observe, that the main object is to prevent the growth of the seed, that this can be attained only by keeping it perfectly cool, and, to ensure this, it is absolutely necessary that only small quantities should be stored together. 2ndly., planting the seed. In all the operations connected with planting the potato, it is more than usually necessary to vary our practice according to circumstances. Early planting is insisted on by most of the great authorities, but in many situations it is scarcely possible to bring the land into a proper state by the beginning or middle of April, which is the time generally considered most eligible. Where the soil and situation admit of it, there can be no doubt that early preparation of the land is a great point gained, there being few seasons indeed in which, between March and June, no favourable opportunity offers for setting potatoes; but if it is systematically delayed till late in May, there will be no escape from an unpropitious seed time. If, from press of work, or other circumstances, late planting is unavoidable, and the season should be dry and warm, the greatest pains should be taken to retain the moisture of the soil. Fresh long dung would then be improper, well rotted manure containing much more moisture. The trenches should be opened only as they are wanted, and filled up as soon as the manure and seed are planted in them; numerous experiments having shown that cut sets planted in dry mould will perish by dry rot, whilst others planted in newly-turned soil vegetate readily. Rolling after planting is also useful in preventing sun and drying winds from affecting the set. The last remedy I would propose, is to plant the potato whole. This is a point which cannot be too strongly insisted on. It is an expedient of the last importance, where the soil or the season is unpropitious. I have never seen or heard of one who has tried it without success. A friend of mine, an eminent agriculturist, has grown potatoes for more than twenty years, always using whole sets, and has never, to his knowledge, had a failing plant. It is important also to observe, that the sacrifice of seed is by no means so great as would, at first sight appear. The trenches admit of being placed at greater intervals, and the sets farther from one another. The produce also will be greater. To establish this fact, the following experiment was made in 1834. Two portions of the same field were planted on the same day, one with cut sets, the other with whole ones, of the same kind of potato, with the same quantity and quality of manure; in short under precisely the same circumstances. On weighing portions of the crop, the cut sets produced at the rate of 35,136lbs. or (at 70lbs. to the bushel) 502 bushels per acre; the whole sets, 48,043lbs. or 686 bushels; showing an excess of 184 bushels per acre in favour of the whole sets. I will conclude with begging your readers not to despise the remedies because they are simple and easy of application, but to try them, and if they fail it will then be time enough to apply to the quack for his 'patent antiseptic fluid, warranted to exterminate dry rot."

An early insertion of the above article will oblige Your obedient servant,

H. S. T.

* Quarterly Journal of Agriculture, March, 1837.

† "Stent on the Failure of the Potato Crop," Simpkin and Marshall.

AN EXPERIMENTAL FARM THE BEST MODE OF AFFORDING AGRICULTURAL INSTRUCTION.

Hitherto we have confined our attention to the improvements likely to be effected by the operation of an experimental establishment in the various branches of rural economy.

We shall now briefly state its importance considered as an engine for promulgating a knowledge of these improvements.

No country in Europe can boast of a greater number of highly educated and honorable gentlemen than Scotland, and in no country are they held in higher estimation among the people. When we consider the numerous and important benefits conferred upon the community mainly through their instrumentality, the patriotic spirit by which they are actuated cannot be too highly extolled. Still it is a matter of general notoriety that the individual exertions of almost all the whole of them, when directed to agriculture, whether in the way of improvement or of profit, have very seldom been attended with success. How then does it happen that these individuals, possessing as they do much general and, in many instances, much scientific knowledge, are yet so little acquainted with those matters that pertain so exclusively to their own immediate interest. The truth is that agriculture, considered as a science, cannot be properly comprehended and understood except from practice.

Undoubtedly many works have been written upon the subject, but in scarcely any two of them do the authors agree, either as to the principles or the details. What is the consequence? The young proprietor takes up a popular author, reads his work, and, as he thinks, masters the subject. He straightway com-

mences farming, but, in nine cases out of ten, he will discover at the end of the season that the results of nature and the conclusions of his teacher are, in many instances, at variance. He no doubt may persist, and frequently does so, but in the course of time the balance sheet speaks such unutterable things against the whole concern, that the gentleman abandons his favorite projects in disgust, and the agent, whose duty it is to conform to the will of his master, is seldom able to withstand the feelings of disappointment and chagrin thus engendered. Improvement, therefore, in the hands of the proprietor is thus impended, and his attempts frequently do more harm than good, for the individual loss is not the only evil that is produced—this comparatively is small—but his mind is steeled and prejudiced against every innovation upon the old system, which may originate upon the part of his tenantry, although such innovation can be demonstratively shown to have all the characters of an essential and radical improvement. Should the tenantry, therefore, apply for the concurrence and assistance of the proprietor in carrying any such improvement into effect, they are told that something very similar had been previously attempted by himself and utterly failed: or if this cannot be alleged, that all innovations are dangerous, that it is always safest to adhere to the old system; and if confirmation be wanted, he will naturally refer to his own experience.

It is thus that the badly conducted experiments of those proprietors who are little acquainted with the practical department of agriculture have a tendency to discourage any spirit towards improvement that may exist amongst tenants; and we believe that many well-meaning gentlemen really make it a matter of conscience to do so, in order that their tenantry may avoid the losses and disappointments they themselves have incurred in travelling a similar path.

Now, were an experimental establishlishment in full active operation these evils would be removed. Such an institution might be denominated a practical school, conducted on such an elegant and at the same time such an extensive scale, as to realize to the full all the expectations of a refined and inquiring mind. Every sound theory on agriculture would there be exemplified, and the young and inexperienced would learn more of the principles and minutiæ of the science, from the mode of procedure there adopted than from all the hypotheses and vague generalities that have never been penned. And not only so, but the information thus acquired would be gradually increased, and the interest kept alive by the regular issue of the manager's periodical reports; and as every innovation would either originate with, or be subjected to the test of, the principal establishment and its subsidiary institutions, so that the evils or the advantages consequent upon its adoption would at once be promulgated and proved before it could be admitted into the practice of the country, we take but a very partial view of the subject when we suppose that every home farm, under the immediate superintendance of an enterprising proprietor, would become merely a profitable instead of a losing investment for capital, as has hitherto frequently been the case. On the contrary, when we take into account the superior education received by our country gentlemen, and the almost indefinite means of introducing and perfecting any requisite improvement which they possess, unlike the tenantry who, generally speaking, during the last ten years, have been cramped and confined on every hand from a scanty and still decreasing capital, and who, even granting they had the will, are not possessed of the power to incur the outlay necessary for these purposes, we say when all these circumstances are taken into account, we may fairly and legitimately infer that the home farm would not only indemnify the proprietor, but that it would take the lead in every movement which had for its object the improvement of agriculture, and would thus become a pattern for the imitation of the tenantry on those estates where the enterprize of the proprietors had succeeded in establishing them.

The position which the landlord at present occupies with reference to the tenant would in this way be reversed. For, in place of the latter soliciting the concurrence and assistance of the former in embarking upon any scheme of contemplated improvement, the landlord, as he ought to be, would become the moving and effective power, and, far from withholding the necessary support, would be the first to offer it, and even to press it upon the aceptance of the tenantry, in order to induce them to adopt any particular course of practice, the benefits of which he himself had experienced. Nor is this all. The landlord could judge of the proceedings instituted by the tenantry on the various farms of his estate, and thus be enabled to form a discriminating and just opinion of their several merits. The backward might be urged forward in the grand march of improvement, and the enterprising encouraged to persevere. But who can estimate all the advantages that would arise, could such a desirable consummation be produced? The proprietor would become so well acquainted with the difficulties wherewith his tenantry had to contend, and all the unfavorable vicissitudes by which their condition is so liable to be affected, that he could administer relief in the way and at the time which no one would know better than himself how to determine. Their interest and that of the tenantry would thus be practically acknowledged to be one and the same, and the agricultural distress which is at present so loudly proclaimed from all quarters of the island, would exist, not even in name.

We thus perceive how it is that the qualifications of our landed gentlemen might be turned to the very best account through the instrumentality of a properly conducted experimental farm. Let us now briefly inquire into the manner in which the information and interest of the tenantry might be directly enhanced from the same cause.

We have seen that if the proprietors were to act the part which an experimental establishment would put in their power to do, the tenantry would avoid many of those inconveniences which are at present inseparable from an enterprising prosecution of their profession. But even although proprietors should not generally and cordially co-operate in a measure fraught with so many advantages to themselves, it must not be supposed that the beneficial influences of such an establishment would cease. The tenantry, in either case, would not fail to receive much sound and valuable information. The certainty that would be introduced into all the departments of agriculture, and the discoveries that would take place in many would not be thrown away, but the intelligent farmer by a careful attention to the experimental results that would be periodically diffused, would be continually receiving fresh accessions to his own acquisitions and experience. A more economical and at the same time a more effective management would pervade every department. The sway of prejudice and error would gradually yield to that of truth and reason, and the results of every process would be so accurately noted and foretold as to form a sure and satisfactory guide in the outlay of his capital.

But further, many an anxious parent, would be glad of an undoubted standard of appeal, when the junior members of a family arrive at such an age as to be associated with the head in the active management of the farm. The ardour and enthusiasm or the young mind, and the prudential caution of the old, seldom coalesce, and the consequence is, that frequent differences in opinion ensue. These, although they may not at first be of a serious description, yet from their frequent recurrence are often productive of very disagreeable consequences. But were an experimental farm in operation no such unseemly scenes would be likely to occur, or if they did, could they be perpetuated. In its present or recorded practice and correspondent results, every difficulty would meet with a ready solution, and thus a powerful antidote would be afforded for the prevention of those disputes, which so frequently mar the peace of families, and in many instances militate against their interests.

We shall conclude this branch of our subject, by showing the advantages of an experimental establishment for giving the intending farmer a thorough knowledge of the principles and practical details of his profession.

We have already noticed the diversity of opinion that prevals among those who write upon agriculture. This arises in a great measure from the manner in which the accounts of every individual

writer are liable to be affected by the diversities in soil and climate, as well as from the experiments described being only partially tested and proved—mere reading, therefore, cannot convey a thorough knowledge of agriculture. The same disadvantage must pertain to a certain extent to written lectures. Without meaning in the least to disparage the talents and assiduity of the present professor of Agriculture, it must be evident that lectures without practical exemplification can only record and generalize past facts and probable truths, and, containing as they do a statement of the various opinions of those individuals who may have distinguished themselves by their investigations in any particular department, they must ultimately depend for their verification upon practice.

The professor, no doubt, performs his duty by giving his pupils a knowledge of all that has been said and written upon a disputed point, but this is not solving the difficulty, and hence the pupil, at the end of the session, will be found to have obtained a knowledge of many fanciful and theoretical plausibilities, accompanied probably with little sound and available information on the subject matter of his profession. Hence an experimental farm would become a most valuable adjunct to the agricultural chair. What can at present only be described would then be exhibited. The living process of vegetable and animal nature would be subjected to the observation of all. The difficulties likely to occur in practice would be actually experienced, and the best mode of solving them exemplified. In fact, the advantages of such an establishment would be as many and as important for the acquisition of agricultutural knowledge as a botanical garden for the acquisition of botany, or for the dissection of subjects for that of anatomy.

Besides it is evident that lectures are not available as an engine of discovery, but merely useful as a means of recording and promulgating a knowledge of them, and when it is considered that the merits of any novel scheme in agriculture cannot at present be tested and understood until it has been exemplified in the general practice of the country, and surmounted the prejudices and preconceived opinions of the greater part of the agricultural community, it is by no means difficult to perceive, that lectures by themselves never can be commensurate with the progress of agricultural discovery. But were the prelections of the teacher assisted in the manner proposed, instead of being behind, they would be considerably in advance in respect of all that was sound and satisfactory in the science. The advantages consequent upon such a forward movement must be obvious to all. The most recent improvements would be practically developed when the pupils returned to their several homes.—*Lewis's Observations on the Prospects of Agriculture.*

EXUDATION OF USELESS SUBSTANCES BY THE ROOTS OF VEGETABLES.

(From the Preston Pilot.)

SIR,—As some of my agricultural friends seem to doubt that most vegetables exude by their roots substances useless to vegetation, for the same species of plant, but supplying salutary nourishment to other kind of plants, thereby explaining in a degree, the advantages derived from a rotation of crops, I request you to insert the following extracts from *Dr. Roget's Bridgewater Treatise.*

I remain, Sir, your's obediently,

ONE OF THE GARSTANG FARMING SOCIETY.

September 25, 1837.

"It had long been conjectured by De Candolle, that the superfluous or noxious particles contained in the returning sap are excreted or thrown out by the roots. It is evident that if such a process takes place, it will readily explain why plants render the soil where *they have long been cultivated less suitable to their continuance in a vigorous condition, than the soil in the same spot was originally: and also why plants of a different species are frequently found to flourish remarkably well in the same situation where this apparent deterioration of the soil has taken place.* The truth of this sagacious conjecture has been *established in a very satisfactory manner by the recent experiments of M. Macaire.* The roots of the *Chondrilla muralis* were carefully cleaned, and immersed in filtered rain water; the water was changed every two days, and the plant continued to flourish, and to put forth its blossoms; at the end of eight days, the water had acquired a yellow tinge, and indicated, both by the smell and taste, the presence of a bitter narcotic substance, analogous to that of opium; a result which was farther confirmed by the application of chemical tests, and by the reddish brown residuum obtained from the water by evaporation. M. Macaire ascertained that neither the roots nor the stems of the same plants, when completely detached, and immersed in water, could produce this effect, which he therefore concludes is the result of an exudation from the roots, *continually going on while the plant is in a state of healthy vegetation.* By comparative experiments on the quantity of matter thus excreted by the roots of the French bean *(Phaseolus vulgaris)* during the night and the day, he found it to be much more considerable at night; an effect which it is natural to ascribe to the interruption in the action of the leaves when they are deprived of light, and when the corresponding absorption by the roots is also suspended. This was confirmed by the result of some experiments he made on the same plants by placing them, during the day time, in the dark, under which circumstances the excretion from the roots was found to be immediately much augmented; but, even when exposed to the light, there is always some exudation, though in small quantity, going on from the roots. That plants are able to free themselves, by means of this excretory process, from noxious materials, which they may happen to have imbibed through the roots, was also proved by another set of experiments on the *Mercurialis annua*, the *Senecio vulgaris*, and *Brassica campestris*, or common cabbage. The roots of each specimen, after being thoroughly washed and cleaned, were separated into two bunches, one of which was put into a diluted solution of acetate of lead, and the other into pure water, contained in a separate vessel. After some days, during which the plants continued to vegetate tolerably well, the water in the latter vessel being examined, was found to contain a very perceptible quantity of the acetate of lead. The experiment was varied by first allowing the plant to remain with its roots immersed in a similar solution, and then removing it, after careful washing, in order to free the roots from any portion of the salt that might have adhered to their surface, into a vessel with rain water; after two days, distinct traces of the acetate of lead were afforded by the water. Similar experiments were made with lime-water, and with a solution of common salt, instead of the acetate of lead, and were attended with the like results. De Candolle has ascertained, that certain maritime plants which yielded soda, and which flourish in situations very distant from the coast, provided they occasionally receive breezes from the sea, communicate a saline impregnation to the soil in their immediate vicinity, derived from the salt which they doubtless had imbibed by the leaves. Although the materials which are thus excreted by the roots *are noxious to the plant which rejects them, and would consequently be injurious to other individuals of the same species, it does not therefore follow that they are incapable of supplying salutary nourishment to other kinds of plants;* thus it has been observed that the *Salicaria* flourishes particularly in the vicinity of the willow, and the *Orobanche*, or broom-rape in that of hemp. This fact has also been established experimentally by M. Macaire, who found that the water in which certains plants had been kept was noxious to other specimens of the *same species*, while, on the other hand, it produced a more luxuriant vegetation in the plants of a *different kind. The fact is of great importance in the theory of agriculture, since it perfectly explains the advantage derived from a continued rotation of different crops in the same field, increasing the productiveness of the soil.* It also gives a satisfactory explanation of the curious phenomenon of *fairy rings*, as they are called, that is of circles of dark green grass, occurring in old pastures; these Dr. Wollaston has traced to the growth of successive generations of certain *fungi*, or mushrooms, spreading from a central point. The soil which has once contributed to the support of these fungi, becomes exhausted or deteriorated

with respect to the future crops of the same species, and the plants, therefore, cease to be produced on those spots; the second year's crop consequently appears in the space of a small ring, surrounding the original centre of vegetation; and in every succeeding year, the deficiency of nutriment on the one side necessarily causes the new roots to extend themselves solely in the opposite direction, and occasions the circle of fungi continually to proceed by annual enlargement from the centre outwards. An appearance of luxuriance of the grass follows as a natural consequence; for the soil of an interior circle will always be enriched and fertilized with respect to the culture of grass, by the decayed roots of fungi of the preceding years' growth. It often happens, during the growth of these fungi, that they so completely absorb all nutriment from the soil beneath, that the herbage is for a time totally destroyed, giving rise to the appearance of a ring bare of grass, surrounding the dark ring, but after the fungi have ceased to appear, the soil where they had grown becomes darker, and the grass soon vegetates again with peculiar vigour. When two adjacent circles meet, and interfere with each other's progress, they not only do not cross each other, but both circles are invariably obliterated between the points of contact; for the exhaustion occasioned by each obstructs the progress of the other, and both are starved."

DOMESTIC PRODUCTIONS.

It is a sound principle in political economy, and one of universal application, that the home production of every article of food, and every substance necessary in the arts and manufactures, adapted to our soil and climate is an object of vital importance to our national prosperity and to individual ease, comfort and independence, and consequently should be actively and efficiently acted upon by every patriotic cultivator of the soil, and receive the cordial encouragement and energetic co-operation of every enlightened citizen.

If that maxim ever made a loud call for the combined action of any people, it is now speaking in most emphatic language to the people of these United States, from the Gulf of Mexico to the Canadian lines, and from the Atlantic to the Western frontiers. Possessing a soil, especially in the northern, middle, and western states, admirably adapted to the successful production of wheat, in quantities far exceeding the demand for home consumption, we have for the last three years imported millions of bushels of wheat and other grains from Canada, England, Germany, France, and the shores of the Mediterranean and Baltic. We are expending tens of millions annually for the importation of silk goods, which abundant experience has proved we can produce, not only without loss, but by supplying work of a delightful character to the hands of thousands of our female population, richly reward their industry.

We are throwing into the pockets of the Dutch between two and three millions of dollars annually, for madder to supply our manufactories, which we can cultivate with as much certainty as we can produce potatoes, and that too, at an immense profit. Witness the following estimate made by Mr. Woodbury, of West Wingfield, Herkimer county, N. Y., for "The Cultivator," by which will be discovered at a glance the expense of cultivation, and the nett proceeds of the article when ready for market.

Seed per acre, 8 bushels at $4	$32 00
Interest of land for 4 years at $40 per acre,	11 20
Ploughing and harrowing twice,	2 50
Dressing first year,	8 00
" second,	7 50
" third,	3 00
Digging,	21 00
Drying, 25 cents per cwt.,	12 50
Grinding,	12 50
Total expense,	$111 70
Product if well cultivated 5000 lbs., average price, 20 cents per lb.,	$1000 00
Clear profit,	$888 00

This estimate does not vary much from those given to the public by Mr. Bronson, and others who have turned their attention to the production of this important dye stuff.

We would here remark by the way, that the deep, rich, sandy loam, found so abundantly in rolling prairies, and burr-oak openings in the vicinity of and about Pike, Fox, and Rock Rivers, is admirably adapted to its most successful production.

We will let the allusion to the above articles suffice for the present, although there are other articles whose importation might be materially diminished, if not wholly superseded, if sufficient attention and proper action were directed to the developement of our inexhaustible internal resources.

If such then is the urgency for the people of our powerful republic to make invigorated exertions for increasing the amount of home productions, how forcibly does the necessity press us as citizens of this rich and lovely land to the vigorous application of all our powers to the rapid developement of the Agricultural resources of Wisconsin.

If ever there were strong inducements presented by any country to excite the ambitious farmer to high achievement and noble purpose in the pursuit of his active, peaceful and independent occupation, they are richly offered by Wisconsin, especially by the south and eastern part of the territory. With a soil deep and fertile enough for a most bountiful production of all grains, grasses, vegetables and fruits that are susceptible of cultivation in this latitude and climate, and with the advantages of the land being cheaply brought under improvement and of being remarkably easily tilled; it possesses an atmosphere than which we believe there cannot be one more pure and salubrious—free of all miasmatic or other contaminating influences, which so often impregnate the atmosphere of newly settled regions with the seeds of doleful disease, and prostrate the settler on the bed of suffering.

Besides these grand essentials to the rapid advancement of agricultural prosperity, which are the common property of every settler of Wisconsin; almost every one finds on his own individual claim innumerable conveniences and sources of every day enjoyment, such as fine water, almost as pure and as transparent as the air we inhale, both in the bubbling fount and the brisk and limpid streamlets—mill-sites within convenient distances to furnish lumber and grinding—stone in sufficient quantities for all ordinary purposes—little natural meadows interspersed among the timbered portions of the country, sufficient for the sustenance of cattle and horses until more luxuriant provender can be procured—vicinity to market, &c. &c.

The above considerations taken in connexion with the fact that the lands of Wisconsin are receiving with astonishing rapidity, settlers who, as a body, excel the first settlers of any part of the United States heretofore brought under cultivation in scientific attainments, intelligence, monied capital, and that spirit of lofty enterprise so predominant in western character, place her future prospects in an exalted attitude, and promise soon to rank her among the first in the scale of productiveness.

This then being the interesting state of existing circumstances, a question arises of material consequence to us all—how can we most rapidly develope the resources of our rising territory? In our next we will answer this question in part by presenting some of the many measures that may be taken to promote the best interests of our community.—[COMMUNICATED.]—*Milwaukee Adv.*

THE ECONOMY OF MANURE.

[*Written for the Chester Gazette.*]

Not anything connected with agriculture is so material to production as the economy of manure; and in proportion to the quantity and quality of this necessary article, or the returns obtained from the land in all situations. The loss of the stimulating properties in dung by the present careless process, is estimated at from one-half to two-thirds of what manure should possess when put on the land.

This art is almost coeval with man—is practised in every situation—and in all countries where the inhabitants are numerous, it is not only most important, but indispensably necessary for their subsistence; and yet, even in Britain, it is the only process, notwithstanding that other branches of husbandry are prosecuted,

perhaps with more skill than elsewhere in any instance.

There is not any profession that affords more opportunity to experiment on a limited scale, without risk or loss, than farming; and yet, there is none where so much opposition is experienced to whatever deviates from ancient custom. But a few years ago, old meadow was considered most valuable, and was preserved and handed down from one generation to another as an heir-loom, but this is now believed in most situations to be injudicious; and it is as usual to break up and occasionally to bring such lands under a regular routine of crops. Draining must necessarily have been practised at a very early period, but the immense utility of this was not generally known, nor was it extensively adopted with effect until within the last twenty years. We need not therefore be surprised at the difficulties in the way of introducing a better system in the preparation of manure, as the waste occasioned by the escape of the stimulating gases that are in dung are not immediately perceptible, and even rain mixing with the more soluble parts of the dung and washing away a very great proportion, is not so much noticed as defective crops from neglect in the mechanical operation in tillage.

Every reflecting and intelligent individual must admit the waste occasioned by the mixture and escape of dung with rain water; but were the farmer told that there is more virtue in what is lost in this manner than in all the straw that can be used, he would not credit the fact. The evil in this case is not sufficiently apparent to induce occasional attempts to collect these washings from the dung heap, and to apply them separately to the lands; but the only means to avert and strike at the root of the evil, is to exclude air and excess of moisture.

The collection and preservation of manure is unquestionably the chief excellence of Belgian farming, and the subject on which we may derive most instruction from attending to these practices. When they have the means of procuring distillery refuse, or any other liquid manure, they form small tanks for receiving it. These are all built of brick four or six together, about seven feet deep, and each division from six to ten feet long, and six or seven feet wide; when empty they are neatly washed inside. All sorts of liquid manures are conveyed from the large towns by the rivers and canals to a considerable distance, and bring a large price. They are bestowed chiefly on the young brairds, or as it is expressed, "the whole spring they are constantly watering their braird with liquid manure, driving carts with barrels across their fields in every direction, and showering upon their young crops," that is, if they have a sufficient quantity of it, they go over all their own crops repeatedly with it during spring. The effect of this must be very beneficial, but the farmer must and ought to depend principally on the produce of his own farm yard for his manure, and it is here that the Belgian system is so admirable. The dung-pit should be excavated to the depth of six or eight feet, and be twelve or fourteen feet wide, and into it may be cast every sort of stuff, sweepings of roads, parings of ditches or banks and dry earth. These being completely saturated with urine and mixed with droppings from the cattle, form admirable manure. Not being exposed like an English straw yard to wind or rain, little or nothing is evaporated or lost. There can be no question about the propriety of the sheltering manure necessarily produced in a farm yard, from the effects of the weather, whether it be sun, or wind, or rain.

Oct. 24. ST. ASAPHENSIS.

SILK CULTURE.

The committee on Agriculture, to whom were referred the memorials from various parts of the state, praying for legislative encouragement to promote the culture of the mulberry and the production of silk, report that they have examined the subject with such attention as its importance seemed to demand, and they now lay before the Assembly the result of their investigation.

The subjects to which they deemed it expedient to direct their inquiries, are indicated by the following questions, viz:

Is it desirable that the United States, and particularly the eastern, middle, and western states, should become a silk growing country; provided their soil and climate be favourable to the culture of the mulberry, and the rearing of the worm?

Are the soil and climate of those states, and particularly those of New Jersey, such as to promise favorable results, if the business should be extensively carried on?

What are the profits of this culture in the silk growing countries of Europe; and what will they probably be in our own state?

What will be the probable results of its extensive introduction, upon the wealth and population of our state?

If the business gives fair promise of being a lucrative one, is any legislative encouragement necessary?

Your committee have endeavoured to give each of these queries a fair and candid investigation, and they will lay the results before you, in order in which the questions are stated:

First. "Is it desirable that the United States, and particularly the eastern, middle, and western states, should become a silk growing country; provided their soil and climate be favourable to the culture of the mulberry, and the rearing of the worm?"

Upon this subject the committee do not think it necessary to dwell long. The consumption of silk is rapidly increasing in our country, as is shown by the Custom House returns. In the year 1821, the amount of silks imported fell short of four and a half millions of dollars; but in 1825 it had risen to nearly ten and a half millions, and in 1836 to over seventeen millions of dollars. These silks are principally brought from France, India, England and Italy: and the question arises, what do we export to those countries to pay this enormous amount, in addition to the many other articles which either necessity or luxury induces us to purchase there. The southern and south-western states send their cotton and their tobacco, and *we* formerly exported our bread-stuffs which some of the European nations would take in return. But the exportation of bread-stuffs from the middle and western states, has fallen off even more rapidly than the importation of silk has increased. In 1817 the amount of these articles exported was nearly twenty and a half millions of dollars; but in 1825 it had fallen to less than five and a half millions, and now it is reduced to almost nothing. During the last year, indeed, we have been obliged to make large importations of grain from Europe, instead of sending any there. The eastern, middle and western states consume more than half the silks brought into the country, and as they have no great staple to export in return, they must either run in debt for them, or be constantly drained of the precious metals. Since then we consume so large an amount of silks in these states, an amount which is regularly increasing, and the countries from which we receive them will take none of our produce in return, it is evidently very desirable that we should grow them for ourselves, provided our soil and climate be such as to promise success to the enterprise.

Second. "Are the soil and climate of the states referred to, and particularly those of New Jersey, such as to promise favourable results if the business should be extensively carried on?"

In answer to this query, it may be stated, that the White, or Italian mulberry, was introduced into this country, soon after the first settlements were made, and has been found to grow well and produce excellent food for the worm, wherever it has been tried; from Georgia to Maine, and from the Atlantic to the Mississippi. At first, its cultivation and the rearing of the worm, were confined to the southern states, as corresponding more nearly in climate with the countries in the south of Europe, where the culture was then carried on. In Georgia, the production of silk was at one time very considerable. In 1759, they exported to England 10,000 lbs. of raw silk, and of such quality as to sell for two to three shillings per pound more than that from any other country.

About the year 1760, the culture was commenced in one small district in Connecticut, and has been successfully continued up to the present time. In 1810,

the value of the silk raised in three counties in that state, was estimated by the United States Marshal, at $23,500; and from recent accounts, it appears that it amounts, at the present time, to more than $100,000. The White mulberry thrives well there; many of the original trees being still in a flourishing state.

A few years prior to the commencement of the Revolutionary war, the business was commenced in Pennsylvania and New Jersey, and carried on with spirit and success. That struggle put an end to the culture, and it has not received much attention since, until within a few years past. There is probably no country in the world where the Italian mulberry grows better than in many portions of these two states; and according to the testimony of Mr. D'Homegue, and other judges of the article, there is none where silk of a superior quality is produced. It has, indeed, been long known that silk grown in the highest latitudes, in which the worm can be reared, is of finer quality and greater strength than that raised further south, the soil being similar; and that which is produced from a sandy or gravelly soil, is superior to that from a heavier soil, the climate being the same. It is then evident that our soil and climate are perfectly well adapted to the growth of the Italian mulberry, almost the only variety of tree from which the worm is fed, in the European silk growing countries.

But within a few years past, another species of mulberry, or morus, has been introduced from Asia, which furnishes at least as suitable food for the worm as the Italian, and in much larger quantity. This is the Chinese mulberry, or morus multicaulis. This tree too, is well adapted to our soil and climate.

The peculiar food for the worm can, then, be raised in our own state and those adjoining, as well as in the most favored of the silk growing countries, and it only remains to be ascertained, in answer to the second question, whether our climate be such as to suit the constitution of this wonderful insect.

Count Dandolo, the most celebrated of the European writers upon silk culture, recommends that the laboratories or cocooneries for the accommodation of the worm, should be so constructed as to enable the person in attendance to keep up a uniform temperature therein, by means of fires, when necessary, and numerous apertures for ventilation. Now, if this be necessary, we can surely guard as well against sudden changes of temperature as they can in any part of Europe, although it may be at a little more cost for fuel. But the committee believe that no such precaution is necessary, except in cases of very extraordinary change of external temperature. They are credibly informed that Mr. Jedediah Strong, of Germantown, near Philadelphia, has fed the worms for 11 or 12 seasons past, in numbers varying from 20,000 to 300,000, and has tried almost every different mode of treatment recommended by writers upon the subject. He has followed Dandolo's directions minutely, guarding against any sudden changes of temperature in the building, and he has also fed them in an open barn, without resort to fires, and therefore subject to all the changes of external temperature. When he has adopted the latter mode, his crop has been even more healthy, and made more silk, than when he has regulated the heat with the utmost care. In the summer of 1837, he fed about 200,000 in this way, and was careful to note the temperature in the barn, three times each day. Two mornings it was as low as 52 deg., and it several times rose to 83 or 84 deg. in the middle of the day. During more than half of the time the worms were feeding, it was either cloudy and damp, or rainy. Notwithstanding these very unfavorable circumstances, his crop remained in perfect health, and made very excellent cocoons. If then, they succeed well in open buildings, in weather so unfavorable, they will doubtless do equally well in ordinary seasons, and in buildings better adapted to the purpose. We may then fairly conclude that both our soil and climate are finely adapted to the silk culture.

But some who admit the correctness of these conclusions, may still be of the opinion that, although we may make as good silk as in any other country, and in as large quantity, in proportion to the land cultivated for the purpose, still the price of labor is so high with us that we cannot make it a profitable business. Let us proceed then to the consideration of our third query.

"What are the profits of this culture, in the silk growing countries of Europe, and what will they probably be in our own state?"

From most of the silk growing countries of Europe we have no such precise information as to enable us to ascertain what are the profits on any given investment or outlay. The opinion, however, is general that the profits are large, and there are some circumstances which go to confirm this opinion. Neither the worm nor the White mulberry on which it feeds, is indigenous to the European silk growing countries. For many centuries after silk fabrics were known in Europe, they were obtained from China by means of caravans which traversed the whole breadth of the Asiatic continent. The Persians were the carriers, and their European customers were so ignorant of the mode in which it was obtained, that they even supposed it to be the fibrous part of some Chinese plant. It was not until the middle of the sixth century that they were better informed. At this period two monks who had been in China, as missionaries, brought a few eggs of the insect, and some seeds of the mulberry to the emperor Justinian, at Constantinople. From this small stock all the myriads that have been reared in Europe have proceeded. The culture was first established in Greece, and afterwards extended to Sicily, Italy, France, and some other countries. Now, it is worthy of remark, that in whatever country this culture has been fairly established, it continues to the present day; interrupted, it is true, during periods of war and civil commotion, but only to be re-commenced and extended when those wars and commotions have subsided. The committee cannot believe that if the business had not been a profitable one, it would have thus held its own, and even have been uniformly extended wherever it has been introduced.

But, fortunately for our purpose, we are not left to mere general inference as to the profits of the most extensive silk growing country of Europe. In 1832, Dr. John Bowring, a gentleman of great intelligence and industry, visited the silk and wine districts of France, under official appointment: and in 1834, after having made very extensive and minute enquiries respecting these two species of culture, he made a report upon them to the Lords Commissioners of trade and plantations, of Great Britain. In connection with a great amount of other facts respecting the silk culture, he gives the following statement of the average profits to the feeder of the worm, viz.:

10 ounces eggs, yielding 1000 lbs. cocoons,	$ 4 70
16,000 lbs. mulberry leaves,	105 28
Rent and expenses in cocoonery,	30 08
	$140 06

The average price of cocoons in France is 23½ cents per pound, which makes $235 for the 1000 lbs. and gives a nett profit of $95 on an outlay of $140, or nearly sixty-eight per cent. But a large proportion of those who rear the worm, reel the silk before it is sent to market, and make a small additional profit on that, as will be seen by reference to the following statement.

The 1000 lbs. of cocoons will make 85 lbs. of reeled silk, the average price of which is $3 76 per pound.

85 lbs. silk at $3 76,	$319 60
Deduct cost of cocoons,	140 06
Expense of reeling,	34 78
	$174 84
	$134 76

This gives a profit to the feeder and reeler of $134 76, on an outlay of $174 84, or nearly 77 per cent. This, according to the report of Dr. Bowring, is the average profit of the feeders of the worm in France, a large part of whom purchase their foliage from the owners of the soil. What the profits are to those who cultivate the tree, he has not informed us specifically, but says it is greater than any other crop. The silk growing in France then, is an extremely profitable business. But still, in consequence of the difference of wages between that country and this,

it may not be profitable in New Jersey; let us examine the subject.

The wages of an ordinary hand, during the summer season, according to the testimony of the gentleman just named, is 1½ francs per day, with board and lodging. This is about 26 cents of our money, or about a half of what we must pay here for an ordinary hand. Now unless we can make more silk, per hand, here, than they do in France, the business will most likely be a losing one. How does the matter stand?

In the first place it may be observed, in general terms, that where labor is low, business is carried on more sluggishly than where it is high, and their implements are more rude and less adapted to the purpose; so that the same sum expended, produces little, if any, more in the former case than in the latter. But the silk grower in our state, will possess great advantages over those of France, independent of the greater energy and expertness of our laboring population.

The silk of France is nearly all made of the Italian mulberry, and that of this country will be produced from the morus multicaulis. The former has a very small leaf, and the labor of picking, which is the largest item of expense in making the cocoons, is very great. The morus multicaulis has a leaf more than five times the size, and the expense of picking is reduced to much less than half, probably to one-third. Again, the latter tree furnishes a much larger crop per acre than the former. It has also another advantage over the White mulberry, which is very important, especially in the commencement of the business. The White mulberry must be cultivated for at least three or four years, before it will be safe to rob it of its leaves, and even then, it yields but a very small crop. But the morus multicaulis bears picking the first year, and, if planted sufficiently close, will yield a greater weight of foliage than the White mulberry would at any age whatever. But it may be enquired, whether, if this tree possesses advantages so great over that cultivated in Europe, it will not soon be introduced there, so as to enable them to compete with us in this respect. In reply to this question, it may be observed that in all the countries of continental Europe especially, they are very slow in adopting modern improvements. The great mass of the people rank low in the scale of intelligence, and are strongly opposed to any modes or systems of conducting business, which were not common with their forefathers. Again, the landed proprietors have their grounds planted with the Italian mulberry, which is yielding them large profits; and they are not very likely to cut them down and replant the land with others, until a long course of years shall have completely satisfied them that they would consult their interest by so doing. If, then, our citizens shall lay hold of the business in good earnest, they will, in all probability, reap a rich reward before there will be any serious competition in Europe, from the general introduction of the same tree.

But it is not only in the species of tree that we have the advantage over the silk growers of Europe. They make but one crop in a season; and that, for want of the means of knowing how to retard the hatching of the worm, is completed before the tree has its full quantum of foliage. Their one crop, therefore, is less extensive than it might be, if made later. But some of our ingenious fellow countrymen have discovered a mode of keeping back the eggs, so as to have them to hatch whenever it suits their convenience, and by this means the feeder is enabled to rear a succession of crops until the frost destroys the foliage in the autumn. The Messrs. Cheney, who have commenced a large establishment for feeding the worm, near the city of Burlington, kept eggs, which usually hatch about the last of May, until the middle of August; and then had them to come out as perfectly as at any early season of the year. This is accomplished by placing the eggs in an ice-house, and then bringing them by parcels, into a warm room, whenever it suits the convenience of the feeder. By this contrivance, we are enabled to obtain more than double the amount of silk from the same ground, that could be obtained where only one crop is fed.

We have also a great advantage over the European feeder, in the arrangements of the laboratory or cocoonery. It is of the utmost importance to the health of the worms, and, consequently, to their production of silk, that they should be kept clean. If this is not attended to, they perish in large numbers; and to effect it, they must be frequently removed from the shelves or hurdles on which they are feeding, and all litter and excrement carefully taken away. This is an operation so tedious, in the European mode of conducting their establishments, that many of them neglect it almost entirely; and consequently lose a large part of their worms, after having had the expense of feeding them until they have attained more than half their growth. This onerous business of cleansing the shelves or hurdles is greatly lessened by means of an apparatus and fixtures contrived by a Mr. Terhooven, of Germantown, which enables one person to attend to more worms in the laboratory, than three persons on the old plan. The committee have examined a model of these fixtures exhibited by some of the petitioners, and they would recommend such an examination to every member who feels an interest in the success of this branch of industry.

When, therefore, the committee have considered all the advantages, which the grower of silk in this country, and in our own state, must possess, for at least a series of years, over his European competitors, they have not doubted that they will much more than counterbalance the difference of wages, and that the profits of the business here, must be greater than they are shown to be in France.

Fourth. "What, then, will be the probable results of the extensive introduction of this species of culture, upon the wealth and population of the state?"

It is a fact well known, that many portions of our state contain large amounts of land, of light soil, and in a very low state of cultivation. Many thousands of acres are to be found, in most of our counties, that yield so little when tilled, as scarcely to repay the farmer for the necessary labor, independent of any rent. It has therefore been a prominent subject of enquiry, with the committee, whether any considerable portion of such land can be brought into profitable cultivation, by the introduction of this business. The result of their enquiries has been, that, although a rich loam, or sandy loam, will probably afford the largest profit to the cultivator, yet even a poor gravelly or sandy soil, if planted with the Morus Multicaulis, will yield such an amount of food for the worm, as to make its cultivation a decidedly profitable employment. They are informed that about 20,000 of these trees were raised the last season, on a lot of poor sandy soil, near Burlington, where no kind of grain could be raised so as to pay for the labor alone, and yet some of them grew full five feet in height, and but few of them fell short of two feet in height, even where no manure was used. It is the opinion of gentlemen acquainted with the subject, that such land as this will yield food enough to make from 20 to 25 lbs. of the very best silk per acre, and that this will afford a nett profit of at least $2 per pound, or from $40 to $50 per acre. If such be the fact, and the committee see no reason to doubt it, how many thousands of acres, now unproductive, will this business render more profitable to the proprietors than even our best lands are at present? How immensely must it add to the solid wealth of our state? For, it will not be such lands alone that will be increased in value, but the whole of the soil must partake of the increase, to a greater or less extent. In one neighborhood, at least, this enhancement of value is already very decided, merely in consequence of the preparation for entering into the business.

But it is not the landholder alone that will be benefited by its extensive introduction. The whole community must feel its influence, and our industrious fellow citizens, instead of emigrating to the fertile regions of the west, will remain contented with their more prosperous condition among those with whom they have associated from infancy. This is a species of industry in which females, and even small children, may be most profitably employed. The gathering of the leaves, the attendance upon the worms in the laboratory, and the reeling of the silk from the cocoons, are all em-

ployments at which women and children can effect as much as robust men Should, then, this business be extensively engaged in, the committee doubt not that it will add greatly to the wealth of the state, and largely increase our population, by removing the inducements to emigration.

Fifth. "If then the business bids fair to be so lucrative, is any legislative encouragement necessary, in order to insure its speedy introduction."

It might, at first view of the subject, be supposed that any new business which gives fair promise of being very profitable, would at once be adopted, to as great an extent as could be desired. Such has not, however, proved to be the fact As has been shown above, this business is very profitable in the silk growing countries of Europe, and adds greatly to their wealth; and yet in each of those countries, perhaps without exception, the culture has been introduced by the special encouragement of government. In a small part too of the state of Connecticut, this business has been carried on for a long course of years, yielding rich returns to those who have been engaged in it. But in other parts of the same state, it seemed to be scarcely thought of, until the legislature took up the subject and offered a bounty for its encouragement. Now almost every part of the state is alive to it, and there is a strong probability that the bounty will be increased. So also in Massachusetts. In this state, the business had scarcely commenced, until the legislature two years ago, passed an act allowing a handsome premium for all the silk raised within its limits. Now, all is activity. Large numbers of the mulberry are under cultivation, and other preparations are making for going extensively into the culture. Manufacturing establishments have been commenced in several of her towns, and the ingenuity of many of her citizens has been set at work, to improve the machinery for reeling the silk, converting it into sewing silk, or weaving it into handsome and substantial fabrics.

The committee may also refer to the action of the legislature of Maine, respecting another species of culture, to show the powerful stimulus which is given by legislative action. In that state, the opinion was almost universal among the farmers that their soil and climate were unsuited to the growth of wheat; and accordingly, almost the whole of their supply was obtained from states, whose soil and climate was supposed to be more favorable. Some of their more intelligent farmers, it is true, had proved that this grain could be grown of such quality, and in such quantity, as to repay them well for their attention to it. But the experiment remained untried by the great mass of her agriculturists, until the legislature recently offered a bounty to every one who should raise a given amount. This immediately produced the desired effect; for, last season, they not only raised enough for home consumption, but even had some to export. We see then, the powerful influence which the encouragement of governments has had elsewhere, and it is probably as necessary that such a stimulus should be applied here.

Nor do the committee believe there is any thing incorrect in the principle of such encouragement. It has been the uniform policy of every intelligent government, to encourage the introduction or extension of almost every species of profitable industry, by bounties or protective duties. Our fisheries have been encouraged by bounties, our commerce by tonage duties on foreign vessels, and our manufactures by heavy impost duties upon similar articles from foreign countries.

So also in Great Britain. Her agriculture, her commerce, and her manufactures, have all been largely encouraged by bounties or protection; and it may safely be asserted, that she owes her wealth and prosperity more to this policy than to any thing peculiarly favorable in her situation or, to the superior enterprise and intelligence of her people. It was this that enabled her to fight the battles of Europe during the wars which arose out of the French revolution; and which furnished her with the means of subsidizing most of the nations of the continent. It was such a policy also, that caused France to increase in wealth and resources, under the rule of Napoleon, notwithstanding the immense expense at which her armies were maintained.

Having thus shown, to the satisfaction, as they hope, of the House, that it is very desirable for the non-slave holding states, in particular, to become a silk growing country, that their soil and climate are admirably adapted to its culture, that the profits of the business must be large, if it be undertaken with spirit and energy, that it must, therefore, greatly increase the wealth and property of the state, and that the legislative encouragement is necessary to insure its extensive introduction, the committee have only to express the hope that the prayer of the petitioners may be granted.

CULTIVATION OF BEANS AND TARES.

SIR,—It is a very common and an excellent practice on the heavy lands in Dorsetshire, and some other counties, when tares (vetches) are sown for seed, to sow beans amongst them; they keep the tares up from the ground, by which means the stem is prevented from rotting, and they kid or pod much more abundantly; and, at the same time, a good top crop of beans is obtained; and after being thrashed they are easily separated. I very strongly recommend this plan, having in many instances seen the benefit from experiments tried in the same field; —one part has been sown without any beans, and the other with the following proportion, and the result has been, that from three to five bushels more of tares have been obtained, and at the same time two or three sacks of beans. The quantity of seed is about two and a half bushels of tares, and one bushel of beans per acre. If winter tares are sown, winter beans should be sown, and if spring tares are sown, spring beans should also be sown.

In the above county, and in Gloucestershire, winter beans are very generally grown on the heavy land. There are two very great advantages in growing this variety; 1st, they are not so liable to blight; 2d, they come to harvest from four to six weeks earlier than the spring beans, which gives the farmer an opportunity of making a good bastard fallow, and which prevents much mischief being done to the land by carting it when in that state. The best plan to put in this variety of beans is to plough them in about four inches deep in each other furrow, which will then leave a space between the rows of eighteen inches, and let the furrows remain whole as they are left by the plough until the spring; and as early as the weather will permit, hoe down the furrows with a hand-hoe; after this the horse-hoe may be used as often as the cultivator may think necessary. This variety of bean, like the trifolium incarnatum, has by many farmers been once tried and failed; but, in almost every case of failure, I have ascertained they have been either dibbled, drilled, or sown broadcast; by either of these methods in putting them in, they are deposited too near the surface, and if a severe winter, they are drawn out of the land by the frosts, and destroyed. They are then condemned, and an idea is formed that they will not stand the winter.

I recollect the first week in July, 1836, calling on a farmer in the neighbourhood of Bishop's Stortford, Hertfordshire, who was rather an experimental man. In the course of conversation, I asked him if he had ever grown any of the winter beans. His answer was, he had sown some the autumn previous, but the frosts had killed them and he had ploughed them up, and that he had made up his mind never to try them again, as he was sure they would not answer in this country, the climate being too cold for them. In less than a quarter of an hour after I left him, and not two miles from his house, I noticed a piece of beans about a quarter of a mile from the road leading from Bishop's Stortford to Sawbridgeworth, which looked very forward. I took the trouble of walking to the field, and there I saw as fine a crop of this variety of beans as could well be grown—at least six quarters per acre, the same year and in the same neighborhood; the average produce per acre of spring beans would not amount to three quarters. On inquiry I ascertained these beans had been ploughed in an oat stubble, about four inches deep. Had the farmer above alluded to adopted the same plan, instead of dibbling them in as he did, I have no doubt he would have been equally successful. My advice is, that every farmer who is a

grower of beans should try the above variety on the plan here recommended, and I am convinced he would give a decided preference to them, and they will always fetch as good a price in the market as at the spring time.

AN AGRICULTURAL TOURIST.

Grantham, Oct. 17, 1837.

N. B.—The best time to put in the winter beans is the latter end of October, or the beginning of November.—*Farmer's (Eng.) Magazine.*

NEW MANURE.

To the Editor of the Mark Lane Express.

SIR,—I notice in your valuable paper of the 5th inst., you allude to the unquestionable and eminent chemist, Lavosier, as to the example in cultivating lands on chemical principles. I have had ocular demonstration of the fact, both in France and England; and am sorry the limit of time prevents me giving you a more lengthened account, which I shall have pleasure in doing in a short period; and I beg to state, from the knowledge I obtained in France, and regular correspondence since I left that country, added to which the successful experiments that have been followed in England, it will not be difficult to prove that on land managed with chemical compost we should ultimately produce one-sixth more grain and seeds than we do at this time, without an y additional expense to the farmer. Referring you to the annexed,

I remain, Sir, your obedient servant,

J. H. SHEPPARD.

Unslet, June 15, 1837.

Important to Farmers.

Patent animalized black, which has proved so effectual in all parts of France, were adopted, for upwards of eighteen months back, possesses the following advantages over bone manure;—

Firstly, It is applicable to the strongest as well as the lighest soils.

Secondly, One ton is equal to thirty tons of common fold yard manure; can be drilled with the present drills as used for corn or seed; or applied as a top dressing, immediately after the plant appears above ground.

Thirdly, The proportion is as half a ton English per hector French, being equal to about two acres two roods English land measure.

Fourthly, Insects do not lodge in the carbonized substances, the animalized black being nothing else.

Fifthly, To use half animalized black, and half boiled bone-dust, is a certain preventive against insects.

Lastly, Five cwt. of animalized black costs no more than the same weight of bone-dust, but produces much greater *effect*, in point of produce on all soils.

N.B.—It is necessary to state, to prevent misunderstanding, this is a different manure to what is selling for animalized carbon, as a sample of the latter was taken by the writer from a sea-port in England, and given to one of the first French chemists to analyze, who pronounced it not to have a particle of carbon in it, observing, at the same time, it possessed qualities superior to bones, as the latter he called the refuse of the animal.

ADVICE GRATIS.

There is much truth in the following advice, given in the *Boston Courier;* and it might be adopted with benefit in our sections of the country as well as in New England.—*Newark Daily.*

A few days ago we heard a hearty and thrifty looking farmer inquiring, in a store in State street, if the gentleman knew of a place in a store where he could put his sons. At the risk of being thought impertinent, we asked him if he knew of a place in the country where a boy was wanted to turn up the sod. He said he did not then, he wanted a hand a while ago, but he hired this man, pointing to his companion, a hale, hearty man of thirty-five. This led to some further conversation, in which we learned that the farmer thought it best to send his sons into the city, to learn a trade, particularly as they were not of stout constitutions, and supply their places by hiring men to work on his farm.

In this opinion the honest farmer was by no means singular, but we apprehended that the advocates of his doctrine lie under a sad mistake. The love of speculation and the hopes of accumulating an independent fortune, or, at least, a competency, without actual personal labor, are the curse of New England. To country boys at 15 to 16, the difficulties of trade and the dangerous uncertainties of shop-keeping are inconceivable. They see nothing but ease and happiness in the employment of the well-dressed clerks of the counting-house, and forthwith they must leave the farm, where money is turned up in every furrow, and health sparkles on every blade of grass, to throw away half a dozen years of the spring of life left behind a counter. Their minority is closed, and they must then enter upon the world with little or no improvement in their moral, intellectual, or physical habits, with no capital but their integrity and good name (if luckily they have been able to pass through such a dangerous apprenticeship without the loss of these qualities) wherewith to commence business, and with the knowledge of no profession, but one that is full of competitors, and which offers them no prospect of becoming independent. The city is crowded with shop keepers, and there is no branch of what may be called *trade* that is not overdone. If a young man obtains credit for a small stock of dry goods, or hard-ware, or groceries, ten chances to one he is unable to meet the *first payment*, and if he should be so fortunate as to have turned his stock and made a small profit by the revolution, the second or third period of payments finds him unprepared, and he must either *clear out* (as the phrase is) and seek a living at New-York, or some other remoter place, or he must write "*Agent*," under his name, on the sign, and struggle with his debts and his bad luck a little longer. The result of this latter arrangement need not be told. Every body knows how few of those who *fail*, ever recover from the shock which broken credit produces; and how hard it is for an "*Agent*" of this description ever to recover the character of a *principal.*

How happy would it be for hundreds and thousands of our young men, if they could be persuaded that a few acres of ground are better capital, than as many thousands of dollars procured by writing their names at the bottom of a negotiable note; and what years of misery might be saved if men would believe that a dollar actually earned by honourable and healthful labour, as farmers and mechanics, is worth a hundred in prospect to be gained in trade and speculation.

THE VIRGINIA CORN AND COB CRUSHER AND GRINDER.

We were called upon a few days since by the inventor of the above machine, Mr. James C. Baldwin, of Virginia, to witness its operation, and so far as we could form an opinion from a single performance, we were gratified with it. It very readily converted the corn and cob into a substance nearly as fine as bran. The cob is so completely crushed with the common mass as to present but very few irregular particles, and we are compelled to say that we think the machine worthy of the attention of agriculturists generally. It would appear almost a work of supererogation to dwell upon the advantages to result from the conversion of the cob into a substance which will prove not only edible but digestible, and particularly as there have been mills for this purpose in existence for many years, and more or less approved of by farmers and planters of distinction. A thing so obvious in itself, it would seem ought not to require argument to enforce it, but such is the force of habit, and such the indomitable tendency of prejudice, that even at this day the utility of feeding the cob in this form is but partially known and less adopted, and upon many estates the cobs of corn are only used as food for the cow when other provender is scarce and difficult to be procured. Of its nutritive properties no one who has ever tasted it, while eating the corn off it as roasting ears, will entertain the least doubt; for its sweet and highly sugary flavour must have convinced him that it not only contains the principle of nutrition, but possesses it in an eminent degree; but it may be said that the sugary taste is not always the test of the alimentary properties of a substance as it is often met with in bodies decidedly poisonous; this is most true; but we affirm without the fear of contradiction, that where we find it in a body known to be perfectly innoxious, as is

the corn cob, we have a right to conclude that it does contain nutrition. The question then, which we have to determine is, which is the best method of feeding with the cob? The answer is at hand—that in which it is easiest digested in the stomach of the animal. But speculation aside: let us resort to the results of experiments, these being the safest guides in a matter of this kind.

P. Minor, Esquire, in a very interesting paper addressed to General Cocke, Vice President of the Agricultural Society of Albemarle, gives the result of a minute experiment made to test the relative nutritive strength of the cob and the corn by distillation. It was, says Mr. Minor, carried on under the eye of an experienced and intelligent distiller, and was as follows: He took ten bushels of the corn and cob, weighing 367 lbs. and ten bushels of pure corn meal which weighed 400 lbs. They were both brewed or mashed on the same day and distilled separately, with great care and accuracy. The product of the pure corn was 18 gallons, and that of the mixture, or corn and cob, was 13 gallons of spirit, each of the same degree of proof. "Now," observed Mr. Minor, "it is generally agreed that the cob constitutes about one half of the bulk of corn; in other words, we give two measures in the ears for one shelled, and the cobs are either used for fuel, or thrown away as of no value." If this were true, the product of the mixture then, should have been only 9 gallons, which is the half of what the pure corn produced But 13 were obtained, four of which must have been, of course extracted from the cobs; or if we estimate its nutritive power by the quantity of spirit, it is clear, that whenever we shell ten bushels of corn, and throw away the cobs we throw away a portion of food, equal to the difference between 9 and 13, or nearly one-half.

"But besides the actual economy, there is another advantage in this way of feeding corn, which ought to engage the attention of every farmer. It is notoriously true, that the unground grain of corn is heating to the stomach of all animals, and of difficult digestion, producing cho'ic, and other inflammatory disorders, particularly in horses, which tend greatly to shorten their lives. They are deprived of the benefits derived from the stimulus of distension, (so necessary to the proper health of animals,) by being unable to eat a sufficient bulk to produce it before they become gorged. But when ground into meal, along with the cobs, and mixed with cut hay or straw of any kind, this necessary distension is produced without any danger of disorders arising from eating too much. It is now eight years since I have been in the habit of feeding corn in this way, and out of six to ten horses, which I have annually kept in that time there has been but one case of sickness among them, which was a slight cholic."

Mr. Robert White of Shrewsbury, New Jersey, in a letter to Judge Buel, remarks:

"A pretty extensive feeder for the Philadelphia market once told me, that a bushel of meal made of corn and cobs was quite equal to a bushel made of corn and oats, that hiscattle throve as fast on the former, and that they never stalled (cloyed) on it."

Mackenzie, an eminent Scotch authority, in speaking of ground food asserts that it is a saving of nearly one half to feed grain in that form."—*Indiana Farmer.*

EXTRACT FROM THE ANNUAL REPORT OF THE PATENT OFFICE.

"Of late, inventors have directed their attention, with peculiar interest, to the improvement of implements of *agriculture;* and many labor saving machines have been patented, which are of the highest utility to the husbandman. These are rapidly increasing, and it is scarcely possible to conjecture to what extent the labor of the agriculturist may be diminished, and the products of the country increased, by these improvements. Already, the process of sowing, of mowing, and of reaping, is successfully performed by horse power; and inventors are sanguine in the belief, (and probably not without reason,) that the time is not far distant when ploughing machines will be driven by *steam,* and steam power applied to many other operations of the husbandman. Implements of this kind will be collected and exhibited at the Patent Office; and, from the resort of thousands to the seat of Government during the season of Congress, a knowledge of their use and practical application will be extended over the whole country. A subject intimately connected with this, is the aid which husbandry might derive from the establishment of a *regular system* for the *selection* and *distribution* of *grain* and *seeds* of the choicest varieties for agricultural purposes.

For commerce and manufactures much has been done; for agriculture, the parent of both, and the ultimate dependance of the nation, much remains to be done. Husbandry seems to be viewed as a natural blessing that needs no aid from legislation; like the air we breathe, and the element of water which sustains life, the productions of the soil are regarded by too many as common bounties of Providence, to be gratefully enjoyed, but without further thought or reflection. Were the two former susceptible of the same improvement with the latter who would not rejoice to enrol his name high on the list of philanthropists, by making the first experiment? This subject has been forced on the attention of the undersigned by those who are engaged in improving our implements of husbandry. The Patent Office is crowded with men of enterprize, who, when they bring the models of their improvements in such implements, are eager to communicate a knowledge of every other kind of improvement in agriculture, and especially new and valuable varieties of seeds and plants; hence, the undersigned has been led to receive and distribute, during the last two years, many articles of this kind, which have been committed to his care, and experience has induced him to believe that there is no spot in the Union so favorable to this object as the seat of Government.

The great disideratum, at the present time, seems to be, that some place should be designated and known as the depository of all articles of this kind, and from whence they may be dispensed to every part of the United States.

Our citizens who are led by business or pleasure into foreign countries, and especially the officers of our navy, and others in public employment abroad, would feel a pride in making collections of valuable plants and seeds, if they could be sure of seeing the fruits of their labors accure to the benefit of the nation at large; but, hitherto, they have had no means of distributing, to any extent, the valuable productions of other climates, which patriotism and curiosity has led them to introduce into our country. To a great extent, they have perished on their hands, for want of some means of imparting to the public the benefit they had designed to confer. Those who have not considered the subject in its wide details, are very imperfectly qualified to judge of its importance.

The introduction of a new variety of wheat promises the most gratifying results, in securing that important and indispensable production from the destructive effects of our severe winters.

A short time since, the most eastern srate of our Union was, in a measure, dependent on others for their breadstuffs. That state is now becoming able to supply its own wants, and will soon have a surplus for exportation; and this is effected by the entensive introduction of *spring wheat.* Among the varieties of this wheat, however, there is great room for selection; there is at least 20 per cent difference, if regard is paid to the quality and quantity of the crop.

And here it may be mentioned that an individual has devoted twenty-five years to this single object, and, from our common Indian corn, has produced a new variety, which, if distributed as it ought to be, may prove a great benefit to the husbandmen of the country.

From the samples transmitted to the Patent office, especially from the shores of Lake Superior, their is a moral certainty of a good crop of corn in the higher lattitudes, if proper attention is paid to the selection of seeds. Inattention to this subject has lost, to the northern portion of our Union, many millions every year.

From experiments made last summer, there can be no doubt that the crop of Indian corn may be improved at least one third; without any extra labor, and this effected by a due regard only to the selection of seeds.

The quantity of flour (wheat or other kind) consumed in the United States, is estimated, on the highest authority, at five thousand millions of pounds; one half of this is snpposed to be wheat, which, at three cents per pound, amounts to over eighty millions of dollars; and the remainder, at one and a half cents only, amounts to over forty millions. If to this is added the vast quantity distilled, and employed in the arts, and consumed by domestic animals, a conception may be formed of the importance of our crop of grain. If then, the quantity should be increased only ten per cent. by improving the seed, the annual gain to the country from this source alone, would not be less than from fifteen to twenty millions of dollars. It is unnecessary to carry out this estimate, to the other productions of the vegetable kingdom; the result would be the same in all. *The well directed efforts of a few years, might give to this generation what would not otherwise be enjoyed in the present century.—Fonda Herald.*

ON THE NEGLIGENCE UNIVERSALLY DISPLAYED IN PRESERVING MANURE MADE UPON THE LAND.

It is needless to descant upon the value of manure to the farmer. The large sums expended annually upon extraneous manure, as lime, bones, soot, rape, &c., prove it to be indispensable. The benefit resulting from the convertible system mainly arises from the increased home supply of this article so obtained, hence it is truly surprising to see what little care is bestowed in collecting and preserving the manure made upon the farm, whilst, perhaps, at the same time, much money is expended in purchasing foreign manure. Nothing is more common than to see dung heaps made upon rising ground, thereby affording the greatest opportunity for the more valuable part to drain away, and it is quite usual when the rain has inundated the cattle yard to open drains for the purpose of letting off the water to waste, carrying with it at the same time the urine and essence of the manure. It would be difficult to calculate how much loss is sustained by the generality of farmers annually from not husbanding their natural sources of manure and from the exhaustion of the soil occasioned by the growth of weeds. In no one department of farm management is the want of a knowledge of the *science* of agriculture more conspicuously displayed than in permitting the urine and liquid part of the yard manure to run to waste. Science consists in a knowledge of the laws of nature. Were the practical farmer acquainted with the quality of urine he would preserve it with as much care as he does the golden grain when stored in his granary. Sir Humphrey Davy after examining an analysis of its properties by M. Benzelius, the celebrated Swedish chemist, observed, "all urine contains the essential ingredients of vegetables." This analysis is given in an article "on the use and value of liquid manure," by Cuthbert Johnson, Esq., to whom the agricultural world is much indebted for several valuable publications. To this article as well as to another "on the value of human manure," from "Dr. Granville's report to the Thames improvement company," and of which we have given extracts, we earnestly entreat the serious attention of our readers being convinced that there is no subject more deserving their consideration.—*London Farmer's Magazine.*

SHEEP—WOOLEN MANUFACTORIES IN THE EASTERN AND MIDDLE STATES.

A small volume compiled by C. Benton, and S. F. Barry, giving an account of the number of sheep, and the principal woollen manufactories in the Northern and Middle States, has recently been put into our hands, which we have examined with much interest, as connected with an already large and rapidly increasing agricultural and manufacturing interest of our country. Although we believe the statement of the number of sheep, and the estimate of wool raised and consumed, is much below the real amount, yet the results may be useful in showing the importance of this branch of industry, and how little is known of the extent of our productions and resources. This we shall never be able fully to know and comprehend, until the general government, in its wisdom, shall establish an *Home Department*, where may be collected correct information of the growth and value of our various agricultural and mineral productions, how much is manufactured and consumed at home, and how much, or what proportion of the whole, or of any one article, is exported.

In the work to which we have alluded, the number of sheep, the pounds of wool, and the total value, are given as follows:

States.	No. of Sheep.	Wool. Pounds.	Value.
Maine.	622,619	2,023,512	$1,021,873
N. Hampshire.	465,179	1,511,832	763,474
Vermont.	1,099,011	3,571,786	1,803,751
Massachusetts.	373,322	1,213,297	612,715
Rhode Island.	81,619	265,262	133,957
Connecticut.	255,169	829,299	418,796
New York.	4,299,879	13,974,606	7,057,176
New Jersey.	250,000	812,500	410,313
Pennsylvania.	1,714,640	5,572,580	2,814,153
Delaware.	150,000	487,500	246,187
Maryland.	275,000	893,750	451,343
Virginia.	1,000,000	3,250,000	1,641,250
Ohio.	1,711,200	5,561,400	2,808,500
Kentucky.	600,000	1,950,000	984,750
Total.	12,897,638	41,917,324	21,168,246

The number of setts of woollen machinery in each of the above States, is as follows:

Maine,	24
New Hampshire,	43
Vermont,	100
Massachusetts,	519
Rhode Island,	80
Connecticut,	184
*New York,	351
*New Jersey,	20
Pennsylvania,	123
*Delaware,	20
*Maryland,	15
Virginia,	—
Ohio,	30
*Kentucky and Tennessee,	40
Total.	1,549

One of the compilers has been a purchaser of wool for ten years past, from 1827 to 1836, and he states the average price that he paid for wool in that time, to be 50¼ cents; upon which the estimate of value is predicated.

The setts of machines used in the manufacture of various articles of woollen goods, is stated to be

For Broadcloths,	344	
Cassimeres,	178	
Sattinetts,	574	
Flannels,	158	
Jeans, Linseys, &c.,	210	
Blankets, Yarn, and Hats,	24	
Carpets,	61	—1,549
The wool produced in the various States enumerated, in the year 1836, was lbs.		41,917,324
Excess of fine wools imported over the exports of 1836,		1,390,678
Total,		43,308,002
The consumption of wool by the manufacturing establishments, estimated at 22,000 pounds per set, per annum, is within a fraction of		31,000,000
Leaving an excess of lbs. to be consumed in families, and held in various sections for a price.		12,308,002
The excess of imports of coarse foreign wool, over exports in 1836, was		10,905,571
Quantity manufactured estimated to be		7,500,000
Excess over probable consumption,		3,405,571
Wool manufactured in families, is estimated to be in the State of New York,		3,500,000
Do. Pennsylvania,		3,000,000
Do. Ohio,		2,000,000
Total,		8,500,000

Leaving only 3,808,000 pounds to be manufactured and used in a similar manner in all the other states.

We have in our possession a statement of the actual number of sheep in each county in Pennsylvania, in 1810, which we publish, with the estimate from the Book in 1836. This estimate, we believe, is very far below the actual number.

* Estimated.

Actual returns in 1810. 618,223
Returns, as per book, in 1836, 1,713,600

Of this number in 1810, 357 were full blooded Merino; 4071 Merino and Common, breed mixed; 759 fine Mountain, or broad tailed; 613,036 common sheep.

We may hereafter notice this work again, and give some reasons why we consider its statements and estimates as in some degree erroneous.

HOPS—INSPECTION OF 1837.

Annual report of C. Higgins, Inspector of Hops for the city and county of New York.

	Pounds
5224 bales, first sort, weighing	1,101,530
173 do. second sort,	33,482
44 do. refuse,	7,559
21 do. condemned,	3,219
Total weight,	1,145,790

Fees, $1,145 79.

WHEAT.

The importation of wheat has again commenced with some activity. Several large cargoes have been entered from Bremen and Rotterdam. We regret the cause of this exceedingly. If our crop is short, we must of course have the grain, but it shows a state of things in this country which should not exist. With the unlimited extent of rich soil which we possess, such a thing as foreign supplies of wheat should never be heard of. Every cargo that comes into this country but tends to put farther off the day when we shall get rid of our foreign debt. —*Baltimore Gazette.*

From the Hampshire Gazette.

BEES.

MR. EDITOR:—I lately observed an article in the Gazette, from the Vermont Chronicle, respecting the security of bees from the ravages of the bee-moth. In answer to the inquiries of the writer, I would observe—1st. Early in the spring a mound is prepared, or in other words the ground is raised sufficiently to secure the hives from injury by rains; it is then beaten down, and smoothed on the top, and made sloping on each side to carry off the water, and rather descending from one end to the other; of a length proportioned to the number of hives there be placed, allowing room for some young swarms to be set by the side of the old ones, as they come out. Boards, or some kind of covering are fixed on the top of the hives in a slanting position, to carry off the rain, and secured by some weight to prevent the covering from being removed by wind. In regard to hives of bees remaining under the trees where the swarms collect, the surface of the ground near my house is rather descending, on which there are a number of fruit trees, such as apples, &c., but where the land is nearly level, a spot is easily raised, by hauling up some earth and beating it smooth on the top, on which place the hive, as heretofore stated, is placed. I generally practice setting my new swarms in a line at the end of the other hives of bees.

I consider it is of no use and no security to an old hive, already taken possession of by the bee enemy, to be put on the ground. The reason I give that bees are more protected on the ground than elsewhere, is the following:—The millers when first entering a bee hive, appear to be rather timid, not venturing at first above the base. They generally deposite their eggs at first, around the inward edges of the hive, and if there are any crevices between the hive and the board or floor that it stands upon, they are quite sure to secrete some of their eggs there; and it will be but a short time before the cots, (or whatever they may be named,) that enclose the worms may be seen, from which the grubs soon make their escape. The grubs will soon creep into the hive, unmolested by the bees, and begin depredations on the honey and young bees. The grubs seem to prefer the young bees that are in the cells to feed upon at first, instead of the honey. A hive of bees that is attacked by the moth is not always destroyed the first year, but is very sure to be the second.

As to the risk of trying the experiment above stated, with one new swarm at least, can be but trifling; and I can state it as a fact that may be relied on, that for some reason or other, I have sustained no injury from the millers, since I have practised the method above described. DAVID CHANDLER.

South Hadley, Dec. 18, 1837.

We add this to our list of small and profitable farming. It does not, however, equal our friend J. L. L's produce; so that JOHN cannot claim the X.—EDS. FARMER.

PROFITABLE GARDENING.

MR. SAYWARD:—Although a mechanic,* I have paid a little attention to agriculture for the last two years, and I thought it might not be uninteresting to your readers to know, that the lands of Penobscot when properly cultivated, will yield as an abundant an increase, as any in the western lands, of which so much is said of the fertility. The piece of land which I cultivated for vegetables the past season, contains by measurement, one acre and ten square rods. It was cleared in the spring of 1835 and the stump grubbed in the fall, but I had many green roots to contend with this year. The land was ploughed in good season, and a tolerable dressing with manure, (not extra) and the seed, planted in season, and good care taken that no weeds should sap the ground, and I give below the result of the harvest, with the prices of the vegetables as they are now worth.

200 bushels potatoes worth 40 cents per bushel,	$80,00
50 bushels dug early for market or family use, at 60 cents per bushel,	30,00
150 bushels ruta bagas at 40 cts.	90000
40 " carrots, at 50 "	20,,00
20 doz. cabbages fit for market 1,00	20,00
20 doz. " worth '50	10,00
8 bushels blood beets at 5s	6,67
5 " parsnips at 5s	4,17
20 " cucumbers at 6s	20,00
20 doz. summer squash at 40 cts	8,00
800 lbs. winter " at 9s cwt.	12,00
10 bushels mangle wurtzels at '30s cwt.	3,00
10 bushels string and shell beans 4s	6,67
100 roots of celery worth at 4 cts	4,00
sold early green peas to the amount	9,00
sold early radishes "	4,00
100 hills of early corn for family use, averaging four ears to the hill, worth in market, 12½ cents per dozen	4,13
Different kinds of garden seeds raised if bought at the seed store would cost	8,00
Lettuce and other vegetables for salads, for family use—say	2,00
	$311,64

I might have sold from 4 to 5 lbs. of summer savory, and about as much balm, and a supply of sage, safron, and hysop and carraway, for family use, for which your readers may judge of their value. J. BROWN.

* John, thou art a good mechanic, and hast proved thyself a good farmer also. We trust many others will follow thy worthy example.—ED.—*Mechanic and Farmer.*

The article referred to in the following notice from the "Farmer's Magazine," was first published in the New York Farmer:—

LIME IN AGRICULTURE.

A very interesting paper was lately read before the members of the Lyceum of Natural History in New York, by William Partridge, Esq., on the proper application of lime to agricultural purposes. Mr. Partridge maintains that the common practice of burning lime before using it on land is founded in error, and that the limestone ought to be *ground*, instead of *burned*. Mr. Partridge says, that in burning the stone two materials essential to agricultural productiveness are driven off, namely, its water and its carbonic gas; and he ascribes to this circumstance the fact, that during the first year the good effects of lime are not observable. He adds, that as the lime returns gradually to its former state of carbonated hydrate, its fertilizing properties are evolved. Mr. Partridge adduces some facts, which seem strongly to favor his theory. An experimental trial of the plan would be desirable in this country.

HINTS TO FARMERS.

The Cincinnati Express has the following:

Buffalo Berry.—Every garden should contain a tree of the Buffalo Berry [Shepardis.] The fruit is calculated to supersede the Cranberry. It ripens late in the autumn, and is valuable.

Swedish Cherry.—This fine cherry ripens in May several days earlier than the May duke. It is a hardy fruit, resisting the attacks of the late frosts, is an abundant bearer, of moderate size, sweet and delicious flavor, and worthy of cultivation for market fruit. There is some doubt as to its correct name. It was introduced in Ohio in 1824, from Burlington, New Jersey, under the above name, but it may be the Portuguese Cherry of Coke.

EFFECTUAL METHOD FOR DESTROYING CATERPILLARS.

An intelligent gardener has communicated to us a plan for destroying caterpillars, which we are sure will be very acceptable to many of our readers at the present moment, when this destructive animal is committing such ravages among the currant and gooseberry bushes in all quarters. His plan is to smoke them. This is effected by placing on some live coal or peat in a flower pot, or other convenient vessel, a small portion of tobacco, and placing it under the bush to be smoked. An old table-cloth or carpet is then thrown over the bush, and bellows used for blowing the peat. In this way, the tobacco smoke, which moves upwards, is confined to the bush, and the caterpillars, in the course of four or five minutes, fall to the ground, apparently lifeless. As they soon recover, however, it is necessary to collect them together with a hoe, and to destroy them. Our informant states, that he has frequently tried this plan, and always with success He recommends the plan being adopted in the earlier stages of the caterpillar, as thereby not only is the injury they would otherwise commit prevented, but the effect of the tobacco smoke is found to act more speedily.—*Ayr Observer.*

Daniel Alford, Esq. of Lockport, a few days since, killed three pigs, between nine and ten months old, which weighed when dressed, nine hundred and forty-seven pounds—the largest weighed 330—the next best 221—and the smallest 286.

I consider the above, a good commentary on the stock of swine, fattened by Mr. Alvord;—but still I wish to say a little more, and particularly to recommend to farmers of this vicinity, and all others who are in the way of making pork, to cultivate this breed of hogs. They are a cross of the Lincoln and Leicestershire species; and from the easy manner which they fatten at all ages—their size when matured, their fine proportions, their color, (which is invariably white,) I feel a confidence in saying, they are superior to any stock, which has ever been brought to this neighbourhood. This kind of swine may be found pure at the county Poor House.

It may be added, that these pigs had no especial or extra feeding. They were managed during the summer in the nsual way; were shut up in the fall, and first fed with apples and pumpkins, with a mixture of barley meal; and afterwards, with barley and peas ground together and scalded.—*Niagara Democrat.*

SILK WORMS.

The quantity of silk used in England annually amounts to four millions of pounds weight. To produce this it is estimated to require fourteen thousand millions of silk worms! If it takes such a vast number to supply this little corner of the earth, what an incalculable quantity of these insects must it take to supply China, where almost every individual from the king to the peasant is clad in the fabric produced from the labors of these minute animals.—*Baltimore Gazette.*

WEIGHT OF SILK WORMS.

When newly hatched it takes 54,526 silk worms to weigh an ounce. After the casting of the skin 3340 worms will make up the ounce. After the second change 610 weigh an ounce. In the week passing between the second and third ages the number of insects required to make up the same weight is 145. During the fourth age 35 worms weigh an ounce. When the silk worm is fully grown six of them will make an ounce. Thus in a few weeks, these insects are multiplied in weight and bulk nine hundred fold.—*Ib.*

AGRICULTURAL SCHOOLS.

Resolved, that a committee be appointed to circulate a petition to the present Legislature, for the incorporation of a 'County Agricultural Society,' with a capital of $50,000, with power to increase it to $100,000, to be divided into shares of $20 each, and to be employed, or so much thereof as may be necessary for the purchase of *an experimental farm*—preparing and stocking the same, and in the establishment in conjunction therewith, of *an agricultural school*, and in such other objects as are calculated to advance the great and permanent interests of the institution.

This is among the resolutions of a recent agricultural Convention in Onondaga Co., New York. There are many similar indications of an increasing interest in the subject of Agriculture. It is certainly quite time that something was done towards the improvement of this important branch of national industry. That it has been too much neglected, is proved by the discreditable fact that we are at this moment obliged to pay Europe for bread to eat. In some of the New England states the Legislatures are offering pecuniary rewards to encourage a more active competition. Something of this sort has been introduced into the Legislature of our own State.

Such is the perfection of farming in England that it is said two-thirds of the population are fed by the agricultural industry of less than one-third. A far greater amount of produce is raised from a given extent of land, than results from the labor of the same number of hands, on the same extent of soil, in any other part of the world. Thinking of the pains which an English farmer takes in draining and manuring his fields in the disposition of his land for various crops, in the selection of seeds, in the use of the best instruments, in keeping up and improving his fruit trees, in the management of his working cattle, and in maintaining a perfect race of cattle or sheep, one might venture to call him a philosopher: though the term would probably excite ridicule in England, where science is almost as much despised in the abstract as in practice it is industriously cultivated.—*Newark Daily Advertiser.*

Sheep consume a greater number of plants than any other domestic animal. Linnæus, in examining into this subject, found, by offering fresh plants to such animals, in the ordinary mode of feeding, that horses ate 262 species, and refused 212; cattle ate 276 species, and refused 218; while sheep took 387 species, and only refused 141. We find, too, great difficulty in preventing sheep from springing over the dykes and hedges that we place as boundaries to their rambling habits, yet how seldom do we see the true cause of their determination to set them at defiance. We may partly account for it by considering their analogy to the goat, and their propensity to scale rugged eminences; but I think these movements rather indicate an anxiety to change a pasture already exhausted of variety, for fresh fields, and herbage abounding in that miscellaneous provision which nature apparently reckons essential for them.—*Farmer's (English) Mag.*

A LIVE RAT EMBEDDED IN STONE.

Yesterday week, as two miners, of the names of Jonathan Thompson and George Douglas, were occupied in blasting a drift in a strata of solid stone, called the scar lime stone, at Alston Moor, six fathoms below the surface, they shot into a small cavity of the rock, out of which to their surprise, sprung a full-grown rat. The miners endeavored to take the animal alive, but in their attempts to do so it was killed. How long the rat had been embedded in its living grave, and in what manner it had contrived, in such a situation to exist (considering the organic formation of the animal,) are questions that must be left to conjecture. On examination, the strata around the cavity was found to be perfectly solid and close in every part.—*Newcastle (England) Jour.*

RAILROAD SAFETIES.

The superintendent of the Providence and Boston Railroad has made a communication to the public upon the death of Mr. Perry, caused by the train of cars coming in contact with his wagon. Mr. Perry was crossing the road, but did not hear the bell, as he was *deaf*. If a man is *deaf*, we suppose he could not hear "bell or book;" but we have sometimes thought that *horses* might take the hint, if given with a less pleasant instrument than a bell. The steam whistle has not succeeded entirely, but we understand that Mr. Norris, of this city, has invented a new instrument, or rather has applied a new instrument to steam locomotives, viz: a *trombone*, which we are told is played with such a gusto by the steam, that it can be heard many squares, tooting away above the noise of the steam engine cars. Not content with a single pipe, Mr. N. is about to add several of different keys, so that there may be a concert of steam instruments; and instead of quiet citizens, who may have got upon the wrong track, being "whistled off," as they have been, or hearing their own knell in the *locomotive* bell, they will hear the "caveat monitor" of the trombones "far o'er hill and dale," and may scamper off beyond the reach of harm—unless, indeed, the music should attract, rather than dissipate, travellers.—*U. S. Gazette.*

INTERNAL IMPROVEMENT CONVENTION.

We always take pleasure in giving publicity to any plan of operations recommended by the people, for internal improvement purposes: and especially so, when they come to us clothed in the same spirit of candor that we find in the proceedings of this convention. We are indebted to the Olean Times for a copy of the proceedings. The convention was composed of delegates from the western counties of this state and Pensylvania, and was held at Ellicottville, Cattaraugus county.

Mr. Bacon, in behalf of the committee appointed for that purpose, reported the following resolutions, which were unanimously adopted;

Resolved, That when experience has so fully proved the great benefits which result to all classes of community from liberal appropriations for works of internal improvement, both in this and other states of the Union, in the opinion of this convention our legislature should vigorously prosecute the system within her limits, and should extend to those sections of the state which have not been the recipient of its favors—the "justice so long deferred," and proceed to the speedy completion of the works now authorised by law.

Resolved, That the New York and Erie Railroad is one of the most gigantic projects of the age—in importance, second to none in the state or nation, and that owing to the magnitude of the work and the unparalleled embarrassment of the country, delays and difficulties must continue to impede its progress by the company—an enlightened policy should therefore dictate to our legislators, to extend such aid as may be requisite for its immediate prosecution, or to assume its construction, and become the owners of the work—and this too as a permanent act of justice to the southern tier of counties in the state.

Resolved, That our legislators be petitioned to amend the act authorising the construction of the Genesee Valley Canal, that the locks of the said canal may be built of the same dimensions and of similar construction with the locks upon the enlarged Erie canal.

Resolved, That the early completion of the Genesee Valley canal is of vital importance to this section of the state, and that the people interested have reason to complain of the delays which have hitherto attended its progress, and that it is expedient that through the legislature an enquiry may be had into the causes of delay, the progress actually made, and the intentions of the canal commissioners in regard to the same—and as the funds are now appropriated for its construction, that our citizens have a right to expect that the canal commissioners will locate and put under contract the remaining portions of the work early the ensuing season, and vigorously prosecute the same to its final completion.

Resolved, That we learn with pleasure that the report of Major G. W. Hughs, Topographical Engineer, to Congress on the subject of the improvement of the Allegany river will be highly favorable to its improvement for steamboat navigation, and that in view of the advantages which are to unite with it, we regard it as one of the most important links in the whole chain of internal inland communication in the Union—and as such we confidently hope and believe Congress will appreciate its national importance, and make a liberal appropriation for the accomplishment of the object.

Resolved, That in the opinion of this convention the interests of this state and of the Union would be greatly promoted by the immediate completion of these three works, that while we have a deep sectional interest in their construction, we view them as national in their character and general in the blessings which they would bestow—to none injurious in their operation, but extensively beneficial to all—and that we rely upon the wisdom of an enlightened State and National Legislature, to adopt efficient measures for their speedy accomplishment.

Resolved, That the proceedings of this convention be forwarded to our Members of the Legislature, and Representatives in Congress, and the Canal Commissioners.

Upon the adoption of the resolutions, the convention was addressed by the President, Messrs. Crocker, Bacon, Alvy, King, Leavenworth, and other gentlemen, and great unanimity of spirit prevailed in the proceedings.

Micah Brooks, President.

Joseph Wilt, } *Vice Presidents.*
B. Chamberlain, }

O. R. Bacon, } *Secretaries.*
S. M. Russel, }

NIAGARA SHIP CANAL.

The following bill, making an appropriation for this important national work, was introduced by Mr. Grain into the House of Representatives on the 26th ult., and was read twice and committed.

A Bill to provide for the construction of the Niagara Ship Canal.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the sum of five hundred thousand dollars be, and the same is hereby appropriated, out of any moneys in the Treasury not otherwise appropriated, to be expended, under the direction of the Secretary of War, towards the construction of a ship canal around the Falls of Niagara, to connect the navigable waters of Lake Erie and the Ontario, on such one of the surveys and plans made by Captain W. G. Williams, one of the United States topographical engineers, communicated in his report under the order of the House of Representatives of the third of February, in the year of our Lord eighteen hundred and thirty-six, as the Secretary of War, upon full examination, shall think will best tend to promote the military defence and commercial interest of the country: *Provided, always*, That this act shall not take effect until the State of New York, by law, shall authorise the construction of said canal within its territorial limits, and shall make such provisions applicable thereto, as are made in regard to other canals constructed in said state; and shall provide also, that such toll may be collected thereon as, in the opinion of the Secretary of War, may be sufficient to keep said canal in repair, and to defray the expenses of lock-keepers and other incidental expenses.

IMPORTANT TO TANNERS.

It is stated that Dr. W. Zollikoffer, of Middleburgh, Md. has obtained a patent for a new discovery in the art of tanning, being an improved process of tanning all kinds of hides and skins in about nine hours. The texture and completion of the leather that is tanned after the operation of this bate is said to lose nothing in comparison with that which has been bated in the old way.—*Balt. Patriot.*

A PRAISEWORTHE ACT.

We understand that the managers of the West Branch Railroad Company have appropriated the money received for fines and penalties for the infringement of their rules and regulations, as a fund subject to the order of the board in favor of such persons as may be disabled or injured in the service of the company, or in the mining or transporting connected with the road.—*Miner's Journal.*

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It may be added, that these pigs had no especial or extra feeding. They were managed during the summer in the nsual way; were shut up in the fall, and first fed with apples and pumpkins, with a mixture of barley meal; and afterwards, with barley and peas ground together and scalded.—*Niagara Democrat.*

SILK WORMS.

The quantity of silk used in England annually amounts to four millions of pounds weight. To produce this it is estimated to require fourteen thousand millions of silk worms! If it takes such a vast number to supply this little corner of the earth, what an incalculable quantity of these insects must it take to supply China, where almost every individual from the king to the peasant is clad in the fabric produced from the labors of these minute animals.—*Baltimore Gazette.*

WEIGHT OF SILK WORMS.

When newly hatched it takes 54,526 silk worms to weigh an ounce. After the casting of the skin 3340 worms will make up the ounce. After the second change 610 weigh an ounce. In the week passing between the second and third ages the number of insects required to make up the same weight is 145. During the fourth age 35 worms weigh an ounce. When the silk worm is fully grown six of them will make an ounce. Thus in a few weeks, these insects are multiplied in weight and bulk nine hundred fold.—*Ib.*

AGRICULTURAL SCHOOLS.

Resolved, that a committee be appointed to circulate a petition to the present Legislature, for the incorporation of a 'County Agricultural Society,' with a capital of $50,000, with power to increase it to $100,000, to be divided into shares of $20 each, and to be employed, or so much thereof as may be necessary for the purchase of *an experimental farm*—preparing and stocking the same, and in the establishment in conjunction therewith, of *an agricultural school*, and in such other objects as are calculated to advance the great and permanent interests of the institution.

This is among the resolutions of a recent agricultural Convention in Onondaga Co., New York. There are many similar indications of an increasing interest in the subject of Agriculture. It is certainly quite time that something was done towards the improvement of this important branch of national industry. That it has been too much neglected, is proved by the discreditable fact that we are at this moment obliged to pay Europe for bread to eat. In some of the New England states the Legislatures are offering pecuniary rewards to encourage a more active competition. Something of this sort has been introduced into the Legislature of our own State.

Such is the perfection of farming in England that it is said two-thirds of the population are fed by the agricultural industry of less than one-third. A far greater amount of produce is raised from a given extent of land, than results from the labor of the same number of hands, on the same extent of soil, in any other part of the world. Thinking of the pains which an English farmer takes in draining and manuring his fields in the disposition of his land for various crops, in the selection of seeds, in the use of the best instruments, in keeping up and improving his fruit trees, in the management of his working cattle, and in maintaining a perfect race of cattle or sheep, one might venture to call him a philosopher: though the term would probably excite ridicule in England, where science is almost as much despised in the abstract as in practice it is industriously cultivated.—*Newark Daily Advertiser.*

Sheep consume a greater number of plants than any other domestic animal. Linnæus, in examining into this subject, found, by offering fresh plants to such animals, in the ordinary mode of feeding, that horses ate 262 species, and refused 212; cattle ate 276 species, and refused 218; while sheep took 387 species, and only refused 141. We find, too, great difficulty in preventing sheep from springing over the dykes and hedges that we place as boundaries to their rambling habits, yet how seldom do we see the true cause of their determination to set them at defiance. We may partly account for it by considering their analogy to the goat, and their propensity to scale rugged eminences; but I think these movements rather indicate an anxiety to change a pasture already exhausted of variety, for fresh fields, and herbage abounding in that miscellaneous provision which nature apparently reckons essential for them.—*Farmer's (English) Mag.*

A LIVE RAT EMBEDDED IN STONE.

Yesterday week, as two miners, of the names of Jonathan Thompson and George Douglas, were occupied in blasting a drift in a strata of solid stone, called the scar lime stone, at Alston Moor, six fathoms below the surface, they shot into a small cavity of the rock, out of which to their surprise, sprung a full-grown rat. The miners endeavored to take the animal alive, but in their attempts to do so it was killed. How long the rat had been embedded in its living grave, and in what manner it had contrived, in such a situation to exist (considering the organic formation of the animal,) are questions that must be left to conjecture. On examination, the strata around the cavity was found to be perfectly solid and close in every part.—*Newcastle (England) Jour.*

RAILROAD SAFETIES.

The superintendent of the Providence and Boston Railroad has made a communication to the public upon the death of Mr. Perry, caused by the train of cars coming in contact with his wagon. Mr. Perry was crossing the road, but did not hear the bell, as he was *deaf*. If a man is *deaf*, we suppose he could not hear "bell or book;" but we have sometimes thought that *horses* might take the hint, if given with a less pleasant instrument than a bell. The steam whistle has not succeeded entirely, but we understand that Mr. Norris, of this city, has invented a new instrument, or rather has applied a new instrument to steam locomotives, viz: a *trombone*, which we are told is played with such a gusto by the steam, that it can be heard many squares, tooting away above the noise of the steam engine cars. Not content with a single pipe, Mr. N. is about to add several of different keys, so that there may be a concert of steam instruments; and instead of quiet citizens, who may have got upon the wrong track, being "whistled off," as they have been, or hearing their own knell in the *locomotive* bell, they will hear the "caveat monitor" of the trombones "far o'er hill and dale," and may scamper off beyond the reach of harm—unless, indeed, the music should attract, rather than dissipate, travellers.—*U. S. Gazette.*

INTERNAL IMPROVEMENT CONVENTION.

We always take pleasure in giving publicity to any plan of operations recommended by the people, for internal improvement purposes: and especially so, when they come to us clothed in the same spirit of candor that we find in the proceedings of this convention. We are indebted to the Olean Times for a copy of the proceedings. The convention was composed of delegates from the western counties of this state and Pensylvania, and was held at Ellicottville, Cattaraugus county.

Mr. Bacon, in behalf of the committee appointed for that purpose, reported the following resolutions, which were unanimously adopted;

Resolved, That when experience has so fully proved the great benefits which result to all classes of community from liberal appropriations for works of internal improvement, both in this and other states of the Union, in the opinion of this convention our legislature should vigorously prosecute the system within her limits, and should extend to those sections of the state which have not been the recipient of its favors—the "justice so long deferred," and proceed to the speedy completion of the works now authorised by law.

Resolved, That the New York and Erie Railroad is one of the most gigantic projects of the age—in importance, second to none in the state or nation, and that owing to the magnitude of the work and the unparalleled commercial embarrassments of the country, delays and difficulties must continue to impede its progress by the company—an enlightened policy should therefore dictate to our legislature, to extend such aid as may be requisite for its immediate prosecution, or to assume its construction, and become the owners of the work—and this too as a permanent act of justice to the southern tier of counties in the state.

Resolved, That our legislature be petitioned to amend the act authorising the construction of the Genesee Valley Canal, that the locks of the said canal may be built of the same dimensions and of similar construction with the locks upon the enlarged Erie canal.

Resolved, That the early completion of the Genesee Valley canal is of vital importance to this section of the state, and that the people interested have reason to complain of the delays which have hitherto attended its progress, and that it is expedient that through the legislature an enquiry may be had into the causes of delay, the progress actually made, and the intentions of the canal commissioners in regard to the same—and as the funds are now appropriated for its construction, that our citizens have a right to expect that the canal commissioners will locate and put under contract the remaining portions of the work early the ensuing season, and vigorously prosecute the same to its final completion.

Resolved, That we learn with pleasure that the report of Major G. W. Hughs, Topographical Engineer, to Congress on the subject of the improvement of the Allegany river will be highly favorable to its improvement for steamboat navigation, and that in view of the advantages which are to unite with it, we regard it as one of the most important links in the whole chain of internal inland communication in the Union—and as such we confidently hope and believe Congress will appreciate its national importance, and make a liberal appropriation for the accomplishment of the object.

Resolved, That in the opinion of this convention the interests of this state and of the Union would be greatly promoted by the immediate completion of these three works, that while we have a deep sectional interest in their construction, we view them as national in their character and general in the blessings which they would bestow—to none injurious in their operation, but extensively beneficial to all—and that we rely upon the wisdom of an enlightened State and National Legislature, to adopt efficient measures for their speedy accomplishment.

Resolved, That the proceedings of this convention be forwarded to our Members of the Legislature, and Representatives in Congress, and the Canal Commissioners.

Upon the adoption of the resolutions, the convention was addressed by the President, Messrs. Crooker, Bacon, Almy, King, Leavenworth, and other gentlemen, and great unanimity of spirit prevailed in the proceedings.

MICAH BROOKS, *President.*

Joseph Wait, B. Chamberlain, } *Vice Presidents.*

D. R. Bacon, S. M. Russel, } *Secretaries.*

NIAGARA SHIP CANAL.

The following bill, making an appropriation for this important national work, was introduced by Mr. Grant into the House of Representatives on the 25th ult., and was read twice and committed.

A Bill to provide for the construction of the Niagara Ship Canal.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the sum of five hundred thousand dollars be, and the same is hereby appropriated, out of any moneys in the Treasury not otherwise appropriated, to be expended, under the direction of the Secretary of War, towards the construction of a ship canal around the Falls of Niagara, to connect the navigable waters of Lake Erie and the Ontario, on such one of the surveys and plans made by Captain W. G. Williams, one of the United States topographical engineers, communicated in his report under the order of the House of Representatives of the third of February, in the year of our Lord eighteen hundred and thirty-six, as the Secretary of War, upon full examination, shall think will best tend to promote the military defence and commercial interest of the country: *Provided, always*, That this act shall not take effect until the State of New York, by law, shall authorise the construction of said canal within its territorial limits, and shall make such provisions applicable thereto as are made in regard to other canals constructed in said state; and shall provide, also, that such toll may be collected thereon as, in the opinion of the Secretary of War, may be sufficient to keep said canal in repair, and to defray the expenses of lock-keepers and other incidental expenses.

IMPORTANT TO TANNERS.

It is stated that Dr. W. Zollikoffer, of Middleburgh, Md, has obtained a patent for a new discovery in the art of tanning, being an improved process of *bating* all kinds of hides and skins in one to nine hours. The texture and complexion of the leather that is tanned after the operation of this bate is said to lose nothing in comparison with that which has been bated in the old way.—*Balt. Patriot.*

A PRAISEWORTHY ACT.

We understand that the managers of the West Branch Railroad Company have appropriated the money received for fines and penalties for the infringement of their rules and regulations, as a fund subject to the order of the board in favor of such persons as may be disabled or injured in the service of the company, or in the mining or transportation connected with the road.—*Miner's Journal.*

SAFETY VESSELS.

The *Liverpool Standard* announces that the subject of the safety ships proposed by Mr. Williams in his paper before the last meeting of the British Association, has at length engaged the attention of government, and they are about constructing a series of steam vessels for the home and foreign service on this plan. The interior of these vessels being divided by numerous bulk heads, and not intended for merchandise, they may without inconvenience adopt this arrangement. Separate portions of the vessel, each water tight, will be appropriated to the engine, boilers, cabins, store department, and for the accommodation of the crew, &c. An additional advantage arising out of this arrangement is, that in case of being fired into, they will not be in danger of that destruction which would inevitably follow a casualty of the kind to the present class of steam vessels. A very fine steamer, fitted up with three safety bulkheads, was this week launched from the yard of Laird and Co., at Birkenhead.

RAILROADS AND STEAMBOATS.

From Blackwood's "World we Live in."

It might be a curious speculation to inquire into the probable effects of the railroad system on mankind. Certainly no system ever became so popular, and so suddenly and so widely popular.—France has begun to fling out those gigantic arms of communication over her noble country. Belgium exults in the commencement of a web of railroads, in which it expects to catch all the stray dollars and centimes of the Continent. The transit from Ostend to the Rhine will, in the course of a year or two, be an affair of a couple of hours. Germany is shaking off her sleep, her blacksmiths are lighting their Hercynian forges, and from the mountains of the Hartz to the Tyrol, huge men, with antediluvian visages and Cyclopean arms, are hammering at iron wedges, rail, and gear for "fire horses." Prussia is laying down railroads from her capital to France, to Poland, and to Austria. The puzzling question of her politicians being, whether she thus invites invasion, or proposes defence. But politicians are blockheads on all matters of common-sense; and of all blockheads, the German politician is the most profound, headstrong and hopeless. The merchant, the traveller, and the tinker know better things. They could tell them, that the roughest of royal rough-riders, was never able to whip and spur either Frenchman, Belgian, Prussian, or Austrian into belligerency, more than fifty years out of every hundred. But, thanks to the growing common-sense of mankind, they never will be able to do even this again, and that the world is beginning to discover that fifty years of victory are not worth one year of peace. In short, the world is evidently become a buying and selling world, a vast spinning and weaving community, a vast aggregate of hands and heads, busy about the main chance, and much more inclined to eat, drink, and be happy, than to burn each other's warehouses, or blow out each other's brains. That war will never cease out of the world, is a theorem founded on the fact that the countless majority of mankind have a strong tendency to be fools; but we may establish another theorem, that the more difficult it is to make war, the less likely it is to be made. The more mechanical dexterity, personal ingenuity, and natural expense that is required to make war, the more will success be out of the power of brute force, and the more in the power of intellectual superiority.

Let war come to a conflict of steam engines, and all the barbarian rabble of the world, Turks and Tartars, Arabs and Indians, Africans and Chinese, must obviously be out of the question at once. They may massacre each other, but they must fly from the master of the mechanics. All the half barbarians, Russian, Greek, Pole, Swede, and Austrian, must make the attempt only to be shattered, and Field-Marshal Stephenson, with his squadron of fire-horses, galloping at a rate of eighty miles an hour, must consume their battalia with the breath of his nostrils. Thus England, instead of feeling alarmed at the sudden passion of foreigners for mechanism, should rejoice to see the passion spreading, should encourage them to throw all their powers into mechanical rivalry, and exult in every railroad that shoots its serpent line among the hills and valleys of the Continent, and hail the smoke of every steam-engine that trails its murky line along its sky, as not merely an emblem, but an instrument of their own superiority.—Mechanism, the great power of art, is as exhaustless as any of the great powers of Nature, for it is only the exhaustless vigor of intellect combining with and commanding the secrets of nature.

Ten thousand years might roll on, and every year see a new advance of every kingdom of Europe in invention, and England keeping ahead of them all, and, like one of her own engines, showing her speed by the sparks that lighten the road behind. The steam-engine in its effective state, is but little more than half a century old, for its invention, in the time of Charles II., left it for upwards of half a century little more than a toy. In half a century more, its present perfection may be looked upon as little else than that of an ingenious plaything. It is scarcely ten years since the steamboat first ventured to sea. Thirty years ago the late Lord Stanhope was laughed at by all London for his attempt to swim the steam-boat from London Bridge to Greenwich. It now dashes from the Tower to Constantinople; or shoots down the Read Sea, fights the monsoon on its own ground; sweeps to Bombay, Ceylon, and Bengal, and astonishes the Mogul and the Emperor of China, the same morning, with the month's newspapers from London. The railway in its present power, is not ten years old, yet is already spreading, not merely over Europe, but over the vast savannahs of the New World. What will all this come to in the next fifty years? What must be the effects of this gigantic strider over the ways of this world? What the mighty influence of that mighty communication which, even in its feeblest state, has been in every age, the grand instrument of civilization! Throw down the smallest barrier between two nations, and from that hour both become more civilized. Open the close shut coast of China or Japan to mankind, and from that hour the condition of the people will be in progress of improvement. The barbarian and the despot hate the stranger. Yet for the fullest civilization, freedom, and enjoyment of which earth is capable, the one thing needful is the fullest intercourse of nation with nation, and of man with man.

The European passion for the railroad is certainly one of the most singular as it is one of the most cheering characteristics of the age. Like all instruments of national power, it may be made an instrument of evil. It may give additional strength to the tyrannical, and accumulate force against the weak, pour resistless invasion against the unprepared, and smite the helpless with unexampled rapidity of ruin. But its faculties are made for peace, its tendency is to make nations feel the value of peace; and unless some other magnificent invention shall come to supersede its use, and obliterate the memory of its services, we cannot suffer ourselves to doubt that the whole system which is now in the course of adoption with such ardor throughout Europe, will yet be acknowledged as having given the mightiest propulsion to the general improvement of mankind.

POET WORKMEN.

It is singular enough, that Mr. Miller, the basket maker, and author of "A Day in the Woods," has a namesake now in London, who is likewise both a workman and a poet. Nicholas Miller, a printer of Stuttgard, is author of a volume of poems which have attracted considerable notice in his own country,—Wirtemberg. He is now following his trade in London, where, although we can pretend no rivalry to the gigantic operations of the Parisian press in appropriating the works of foreign countries, there is still employment for some few printers of French and German. The king of Wirtemburg, in his recent visit to England, took notice of Miller, and presented him with what the Hamburgh correspondent calls a "truly royal" contribution to his support, and "further education." From the latter expression, it appears that Miller is following the old and approved fashion of the German, travelling to perfect himself in his trade. Those who are thus enabled, are, it is well known, often slenderly furnished with money, and looked upon as entitled, without any forfeiture of their respectability, even to beg on the road.—*Ib.*

PIRATES OF ANTWERP.

From the port of Antwerp alone, and in the month of September alone, printed books were exported to the value of 97,822 francs, or not a thousand pounds short of four thousand, and it is supposed, that a much larger exportation takes place by land than by sea from Belgium, principally to Italy, Germany and Holland. Not one in a hundred of these works is of Belgian authorship or public property—they are almost all piratical reprints of Parisian copyrights, while the reading public of the continent is supplied with piratical reprints of all *but* Parisian copyrights by the Parisians themselves. The gunner is here indeed "hoist with his own petard."—*Ib.*

FRENCH SUBSTITUTE FOR INDIGO.

Public attention has been latterly attracted in France by the reported perfection to which the discovery of a substitute for indigo has been brought, and by the establishment of dye-works on a large scale for applying the process to the dying of wool and woollen cloths, for which it is more especially suited. This new product is called French blue *(blue de France,)* and its advantages are thus described:—1st. Its colour in all its shades, is of very superior beauty to any thing yet known. 2d. It is perfectly unchangeable by air, acids, soaps, &c. 3d. It never whitens at the seams, like indigo. 4th. It dyes in or penetrates the piece in the most perfect manner, which cannot be done with indigo. 5th. It preserves the quality of the cloth with all its softness and suppleness, without in any way altering the texture or nap. 6th. It facilitates the reproduction of the same shades, which is so difficult with indigo. 7th. Its results in the execution are so sure, that an exact estimate may be made beforehand of the expense and product. 8th. It offers a very considerable saving upon the value of the raw material (prussiate of potash,) which is an indigenous product of moderate price, susceptible of a reduction to a value still less, and by which, according to the quality of the cloth, it may be dyed at from 25 to 50 per cent. less expense than from indigo. 9th. It is said to be of great advantage for furniture, carriage and livery cloths, and for tartans, merinos, cachemires, &c. on account of the superior clearness and lustre of its colours. 10th. It produces an economy of 12 to 15 per cent. in the manufacture of the cloth, by the solid application of the colouring matter in piece, which has only been effected till now in black and scarlet. Such are the large results promised by this discovery, which appears to be looked upon by the parties originating it, as well as by several of the first woollen manufacturers of France, as likely to render France independent of foreign countries for the supply of indigo, of which she now consumes to the amount of 20,000,000 francs per annum.—*London Times.*

EXCURSION TO THE NORTHWICH SALT MINES BY THE BRITISH ASSOCIATION.

Mr. Deck, the intelligent practical chemist of Cambridge, has published the following interesting narrative:

To the Editor of the Cambridge Chron.

Sir—Being one of the favoured few of the members of the British Association, during its late meeting at Liverpool, who were included in the geological excursion to the Marston Salt-mines at Northwich, I feel anxious that a more explicit detail should appear than has yet been given of the very liberal conduct of the proprietors, and the extreme interest and novelty of the excursion. As the number was obliged to be limited, about 60 from a long list of members who had entered their names were selected out, and at eight o'clock on Saturday morning last they assembled at the Railway station, where a beautiful locomotive engine, "The Spitfire," and a train of carriages, were placed at their disposal by the Railroad Company; and, in the space of one hour and ten minutes, it arrived in great style at the Hartford station, a distance of 32 miles, being the nearest point of the road to Northwich. Here carriages of all descriptions were provided by the liberality of the gentlemen through whose kindness this delightful trip emanated, and conveyed the party four miles to the mine, through a country whose thick population were on the alert to view the "*curious larned men*," as they were termed. Every preparation had been previously made by lining the bucket and rope with cloth for a clean and safe descent, which was effected down a shaft of 400 feet by means of steam power, four individuals descending at a time, under the careful superintendence and watchful eye of a principal overlooker. All being safely landed, a scene of wonder and astonishment opened to view that will not easily be effaced from the memory of any one present. The extent of the excavations amount to 50 superficial acres, the principal parts of which were illuminated by upwards of 4000 candles, tastefully displayed against the glittering rock, and some arranged in devices of "V. R." with a crown, also "B. A." The effect was magical, and the unexpected combustion of some crimson fire and blue lights (which a lover of the pyrotechnic art luckily possessed) upon the sparkling crystals of the mine, brought to mind scenes in the well-known and oft-read tales of *Sinbad* and *Aladdin;* the enchantment of which was much increased by the moving trains of salt, drawn by horses from various parts of the mine towards the shaft, illuminated by candles, in honour of the visit, which produced an extraordinary and beautiful effect. Sixty men are employed, and upwards of 1,000 tons of salt annually raised in these pits. After a gratification, not to be described, in viewing the wonders of these subterraneous treasures, the company were shewn to a part of the mine, where (as if raised by the hand of magic) appeared a most sumptuous repast—a table with every delicacy, and decorated with beautiful flowers, wax-lights, and a profusion of the choicest wines; and it may be believed that, from previous exertion and the extreme novelty of the *dejeuner*, full justice was done to the viands, and the interest of the scene was considerably heightened by the attendance, in such a situation, of four female servants to wait upon the company. C. Worthington, Esq., and T. Firth, Esq., (the spirited and liberal proprietors of the mine,) acted as president and vice president, and proposed the health of "The Queen," with three times three, and which was honored by the discharge of some small pieces of cannon, the effect of which, reverberating for a considerable time through the extent of the mine, was very extraordinary.

The health of "Professor Sedgwick" was given with great applause, as likewise "Success to the British Association," for which latter toast thanks were returned in a neat and elegant speech, by a gentleman who afterwards proposed "Our excellent and liberal hosts, the proprietors of the mine," with nine times nine; and if gratitude could be evinced by hearty cheers, it was here most vociferously testified. The compliment was acknowledged by one of the proprietors, who made some beautiful allusions to the situation in which the company were then placed, and suggested that as it would be prudent, from the peculiar journey we had to take, that the head should be kept cool and the hand steady, we drank to "Our friends above," and all then adjourned from the festive board, and proceeded to the shaft, where "God save the Queen" was sung by the whole company in full chorus. Just previous to the ascent, a rev. gentleman in the company most aptly proposed that, as we had sung the praises of our earthly sovereign, it would not be inappropriate to sing praises to our heavenly one, particularly after viewing the stupendous and wonderful works of His creation, where we were then assembled, and suggested that the beautiful and appropriate lines of

"Praise God, from whom all blessings flow,
Praise him all creatures here *below*!"

should be sung. All voices quickly responded to the call, and it was reverently and devoutly sung to the tune of the 100th psalm. By the same judicious and careful arrangement all were safely raised to the surface, and quickly conveyed to the steam carriages, where instructions were given to show the effect of railway speed; and in an hour we were delightfully conveyed the thirty-two miles to Liverpool, having effected, in the course of eight hours, a distance of twenty-seven miles, and spent five hours in the mine—concluding an excursion of intellectual enjoyment which will long be remembered with delight by those who were fortunate enough to be present.

I remain, Sir, &c. I. Deck.

King's Parade, Cambridge, Sept. 12.

THE INTERIOR OF A COAL MINE.

Translated from the Courier des etats Unis.

St. Ettienne is, properly speaking, one great workshop. Its busy prosperity, continually increasing, has not yet acted in a perceptible manner, upon the primitive disposition of its inhabitants. The population of this city, in the space of thirty years, has increased three fold—its size has increased in proportion. At St. Ettienne no one is idle. Both sexes, all ages, all conditions give themselves up to labor. From the cellar to the garret, by day and by night, the ears are stunned by the confused tumult that the ringing of anvils, the screeching of files, and the simultaneous noise the different trades produce.

Men, women and children forge iron or weave silk, the alliance of which two trades is not the least wonderful phenomenon of this singular city. At fifty fathoms beneath the soil, even they labor—the bowels of the earth conceal another mass of courageous, devoted, indefatigable laborers, and whose profession is but one continual wrestling with death.

Some travellers have given us an account of the salt mines of Poland, and the copper mines of Dalecarlia. The picture that has been given us is such as the most fantastic imagination would have fancied. We might believe ourselves in an ideal world, a creation of fairies and genii. These subterraneous cities, these streets, straight to a line, and shining with a brilliancy continually equal—this population radiant with health and contentment, which resembles, in every sense, the hours of repose, in courts and houses—this spectacle of life, motion, abundance, and even of luxury, where a ray of the sun has never pierced, or a trace of vegetation ever animated—all this, we say, is singularly proper to awaken curiosity. How much difference there is in this description, from that of a coal mine! Here on the contrary, all is sombre, all is isolated, every thing breathes forth sadness and horror—but if its appearance seems less poetical, it leaves upon the soul of the observer an impression more deep, more magical. It remains astonished with the esignation, intrepidity, and even heroism which necessarily belongs to these men, who, true martyrs to labor, bring themselves voluntarily in gloomy darkness.

The coal mines that surround the basin of the Loire do not communicate with one another—they have each their own issue in the form of a well. As soon as the foot is placed without the city, a building of wood is met with, here and there, blackened with soot, enveloped in smoke almost as large as the Morgue. It is called Vargue.

To imagine what must be the descent into a coal mine, it is necessary to call to mind the summit of one of the towers of Notre Dame. A little vessel of a circular form, constructed of planks, and scarcely two cubic feet in depth, descends before you, balancing itself on the extremity of a cord, and about the length of an arm distant from the wall. The moment of embarking comes—you look up to the heavens and the clouds—you lean forward over the gulf, so as to lose the equilibrium beneath your feet. It is a horrible moment. You must place one foot in the vessel, and but one—place it quickly, and you are plunged whirling into the abyss. In proportion as the vessel sinks, the opening grows smaller, the light is enfeebled, the air becomes more rare, the temperature more elevated—your chest sinks with uneasiness, and raises itself in spasms for breath. The walls of the well are wet with dampness, you meet, at first, with some marshy plants, afterwards nothing, not a blade of grass. In the midst of the confused murmur which fills your ears, you distinguish the noise of some drops of water, which fall into the well at measured intervals, like the noise of a pendulum of a clock. In the midst of the journey, you meet the ascending vessel, the contact of which is dangerous. You repulse it with the foot remaining outwards—if this motion makes you totter—if you have the misfortune to support your hand upon the smutty and oily wall, your hand slips, the vessel turns over, and you are launched into eternity, as the English say.

You may now ask, what is it, in comparison with such a descent, to venture in a bark, to feel beneath your feet, while flying from the shore, but a moving plank between you and the sea. Oh! how glad you would be, when plunging for the first time into a mine, to find yourself upon the sea, rolling in its foam, beholding the sun, and breathing the air freely! You may there enjoy the light, the air, and your arms, upon the waves—but in a dark and narrow well, close as a prison, deep as a whirlpool, and horrible as annihilation, it is far different—yet a miner hastens down as gaily as a sailor on ship board; and those have been seen, who, either by bravado or an indifference to danger, descend two hundred metres, holding themselves by griping a cord, without any support under their feet. One trembles to relate such a trial of strength, more common than is imagined! What is it then to see it?

Arrived at the bottom, you are placed upon a narrow plank, which covers, in the form of a bridge, the bottom of the well, a deep basin filled with thick and muddy water. When you let go the cord, your feet are tottering like those of a drunken man—your heart beats, and your head grows heavy. The heaven is to your eye but one resplendent point. Before you, opens a gallery, then another, then a pandemonium of narrow corridors, dark and damp, which increase, mingle and grow entangled, like the windings of a labyrinth. You see, afar off, some red glimmers that light up, by their reflection the drops of water which hang from the roof, and the veins of gold that streak the coal like ribands. You creep an hour, sometimes upon your knees, sometimes upon your breast, and meeting at each step only pools of ice, an infectious air that suffocates you, and, moreover in the midst of the joyous chants that reach you from all sides, across the thousand mouths of the galleries, like the magic choirs of *Robert the Devil*, or the *Temptation*. Whilst you listen to this invisible harmony, you are elbowed by a minor, who passes, bent double with a bag of coal on his back, holding a lamp in one hand, and supporting himself with the other, upon a little staff of iron. At length you arrive at the places where they are at work. Ten laborers are there, half naked, kneeling upon the ground, and cutting laboriously, enormous masses of coal, the surface of which sparkles with blue and gilded spangles.

The state of a minor is hereditary:—this is a privilege that no one dreams of attacking. Ordinarily he knows neither how to read or to write; for what use, what has he do beneath the sun? Speak to him of sending his children to school, he will not understand you; he works from the age of six years; his father died in the mine, he will die there also. Sunday is the only day of the week on which he can see the sun—on that day he rises before the dawn. To dirty and torn garments succeed a jacket of velvet, a grey hat with large flaps; and for his wife, a calico petticoat embroidered with flowers and lace. Touch the hand of the miner, he salutes you, he speaks to you, he smiles upon you, he raises his hat, he speaks, he smiles upon everybody. How proud he is giving his arm to his wife, whom he leads to mass, and from mass to the inn, according to ancient custom! For the miner is a free thinker; new ideas have not shaken his old belief; in his ignorant simplicity, he believes, he practices what his ancestors have believed and practised; and if he consecrates some hours to the enjoyments of the inn, it is not to contract there a taste for idleness and dissipation. The week is so long in a mine, that one need not reproach him for the few moments that he spends in refreshing and making himself merry! Besides, it is rare that he abuses them; he is in the midst of his family, and his brothers, for so he calls his fellow-laborers.

This class of workmen, is filled only by those upon the spot; very few foreigners embrace this profession. How could it be otherwise? One can scarcely believe that the daily salary of the miner rarely exceeds the rate of two francs, and that it is for so trifling a sum that he subjects himself to privation and unheard of fatigues; that he exposes himself to dangers of every kind, and to numerous chances of violent death.

When he works, he has for clothing only a shirt and trowsers of blue cloth, open upon the breast, and the sleeves of which are raised to the shoulder; a hat of iron, wooden shoes and no stockings.

The whole of his body is covered with a coat of thick and muddy soot, which leaves open to sight only eyes made red by incessant labor, and between his lips teeth white enough to excite envy in a woman. The layer of coal is not more than three feet in thickness; it is almost as high as the gallery. He extends himself face downwards, digs a furrow as deep as the layer, while uttering sighs which tear his breast, like a baker kneading. By the aid of a wedge that he buries to its depth with tremendous blows of a club, he succeeds in detaching from it enormous fragments; perspiration bathes his forehead, all his limbs tremble; his body is often even bruised in many places by blows from a mass of coal, or some splinters which have reached him, but there is no cession; he has under his eyes a rigid and pitiless overseer. There is a workman chosen among the oldest and most experienced to superintend the work. They give him the name of governor. This chief, almost as absolute as a captain on board ship, has not the habit of spoiling by excess of indulgence his subordinates so lately his equals. Some of the workmen called drawers carry away the coal as fast as it is broken up, in carts or in bags, which are loaded upon their backs.

The general work in the mine is interrupted one hour in the day; it is the hour of repast. When this hour arrives, every arm stops with wonderful agreement;—the pickaxes remain in the blocks almost falling out; the loads are let fall half way; every one moves; the most industrious have quitted their work; in two minutes the innumerable galleries are as full as our streets on feast day. From all quarters of the mine they assemble under a dripping roof, in a kind of square where many galleries cross and meet—an irregular and inclined polygon that they call a room—a magnificent room, in truth, with its polished pillars, where gold and azure are mingled with ebony; with its roof hung with drops of water like pearls of dew; with its thousand torches, which throw upon this scene a light as brilliant as that of the lustures and candelabra of our opera; a magnificent apartment, but where it is impossible to remain standing. All the miners seat themselves upon the damp ground in a circle, suspend their lamps to the roof, and draw their provisions from their sacks. Alas, with the trivial wages that are given, one may judge of the quality of their repast; it consists almost always of brown bread, milk, and cheese. Wine is an object of luxury; if any one among them have brought with them by chance, the fruit of their savings, or a present from their wives from some anniversary, do not think that they reserve it for themselves alone; they offer it to their comrades, and each bottle passes from hand to hand around the circle;—each one drinking and giving it up to his neighbor, each one wiping his mouth with his thumb; for their exists among miners an equality of affection as great as between brothers, and, as we have said, they never call one another by any other name. There is something noble and touching in this simplicity of name.

It is in the midst of these brave people, more than in the bosom of our proud cities, more than in the counting houses and saloons of the happy people of our time, the privileged of society, it is in the midst of these poor workmen, we say, that we find the spontaneous and disinterested practice of the two most beautiful precepts of the Gospel, labor and charity! How many virtues, how many acts of courage, self-denial and devotion have remained buried in these depths, where they flourish and the world will always be ignorant of it! The cloister have had their chronicles, their histories, but the mines, have they ever had them?

There is nothing in the world, not even the sombre and majestic appearance of an old cathedral, which awakens such severe, such solemn thoughts, as the interior of a mine. There every drop of water that falls, every echo that sounds, every light that shines, warn you as eloquently of your nothingness, as the funeral marble that is trodden beneath the foot, or the death-knell of a neighboring church. In a mine, man in vain attempts to master his emotions, to arm himself with a pretended courage; he feels that he is in the presence of death, and if the spectacle is new to him, it is difficult not to allow himself to be overcome by an involuntary error.

It is not there assuredly that a trappist would dream of digging his ditch; for it is the nature of man to cling to life closer, the nearer death approaches. Now, in the bottom of these infernal regions, death threatens him on all sides; it is at his feet; it is above his head; it is all around him; water, fire, earth, it clothes itself in every form; it borrows of all the elements to vary its means of destruction. Let one grain of sand detach itself; let a current of water break through the narrow layer of soil that restrains it; let a hollow and distant explosion interrupt the silence of the subterraneous echoes, and behold a troop of unfortunates belong no longer to the living! These galleries, so low that it is necessary to pass through them creeping, owe their foundation to late convulsions; strong pillars bend already under the weight of galleries that to-night, to-morrow, or later, will crush them like shattered glass. The heaps of earth that are seen on the surface of this mine indicate perhaps as many tombs; no cross, no stones, no imperishable garlands reveal them to the indifferent traveller;—but often towards evening, a mother, a widow, or orphans come to kneel there piously on the soil, bare and entirely denuded of grass.

This species of the earthquake is only the least of the dangers that threaten the miner; he has to dread more from the sudden inflammation of the gas; for the empire that holds rule over him, prevents him in many places, from making use of the beautiful and inappreciable discovery of Davy. If this meteorological phenomenon is not to his eyes the work of a secret power, or an infernal spirit, it is still in his superstitious belief, an accident that is not in the power of man to prevent the signal of almost certain death. But all these dangers are not the more real, because they are not beyond the knowledge of man; science and learning will soon succeed in preventing them entirely, or in rendering them infinitely more rare. It is not the same with instantaneous inundations. In a moment, at one blow of the pickaxe, one blow made carelessly, might inundate the mine, and this without any one having time to take one step backwards, to utter one regret for life, one thought for his family, one prayer to God. The existence of one hundred, and sometimes two hundred men, is thus thrown at the mercy of one imprudent laborer. Ask the miners to relate to you any of these catastrophes, all will make the sign of the cross. This mine where they work is a theatre of them; the youngest has been witness to them; not a single one among all who has not one of his friends to weep for.

QUANTITY AND COST OF FUEL CONSUMED IN THIS CITY IN THE YEARS 1836 AND 1837.

From the City Inspector's annual report to the corporation, it appears that in the year 1836 there was sold in this city 243,798½ loads of fire wood, costing $691,347 83½ cents; and that in 1837 there was sold 298,427½ loads, costing $625,471 84½ cents. From which it appears that though the quantity sold in 1837 was greater than in 1836 by 54,629 loads, yet the total cost was $65,876 80 cents less.

The quantity of charcoal sold in 1836 was 291,886 tubs, at a cost of $112,211 20 cents. In the year 1837 there was sold 284,110 tubs, which cost $83,200 59 cents; being 7,776 tubs less than were sold in 1836. Less cost for charcoal in 1837, $26,020 24 cents.

The amount of Anthracite coal returned, is 5,609 tons less than in 1836.

The report states that the aggregate saving to the city in 1837 as compared with 1836, on the above articles of fuel, is $248,682 25.—*Journal of Commerce.*

THE PACHA OF EGYPT.

In speaking of the present Pascha of Egypt, and the rapidity with which he causes works of improvement to be completed, Mr. Catherwood mentioned in his lecture of Friday that a canal connecting Alexandria with a point on the Delta forty-four miles distant, and suited for vessels of forty tons burthen, had been completed in nine months. With such energy in the sovereign there is no wonder that Egypt is rapidly regaining its former consequence.—*Balt. Amer.*

BRICK AND CEMENT BEAMS.

A fresh series of experiments have been trying during the present week at the Royal Engineer establishment, Chatham, by authority from the Board of Ordnance. Three experimental brick beams, each resting on piers of brick, were constructed and broken by weights, which were applied over the centre of each. The piers were 2 feet 6 inches high and 18 inches square. The beams were 10 feet long, of the same width as the piers, and 1 foot thick. No. 1 beam was built of pure cement. No. 2 was also built of pure cement, with the addition of five longitudinal pieces of hoop iron, one of which was in the centre joint, and two others in each of the remaining joints. No. 3 was built with mortar, composed of three parts clean sharp sand, and one part of Halling Lime, and had also hoop iron in the joints. The wood work for supporting Nos. 1 and 2 was removed in nine days, and that for supporting No 3, in six weeks after they were finished. No. 1. beam was broken down, but it yielded sooner than it was expected; but it proved that for buildings where beams are usually used, it may be safely applied. No 2 also was a satisfactory experiment. No. 3 was tried on Saturday. The object of the experiment was to ascertain the use of cement-bond in the walls of buildings, as a substitute for bond and chain timbers; and also for ascertaining what additional strength is added to the bond by using hoop iron in the joints. Mr Brunel first tried some very interesting experiments, proving the extraordinary strength of brick work, laid in pure cement with hoop iron in the lower joints, but the same thing had not been tried without hoop iron, which led to the experiments under Colonel Pasley.

We have since been favoured with the following correct report of the results of these experiments, by a gentleman who was present on the occasion. The reader will refer to the paragraph in our last number (p. 16) for the description of the construction of each beam.

No. 1 beam was broken on the 27th at 2 P. M., with a weight of 298 lbs.; the break was not in the centre, but extended in two vertical seams, the one about 6 inches, the other 18 from the centre.

The strength was in favour of the cement, for in no direction did it give way; but on the other hand, the bricks were rent with an even fracture.

Another experiment was then made with the largest piece remaining, which measured about 4 feet over the piers: this required a weight of 2356 lbs., and the fracture was similar to the former.

No. 2 beam was tried on the next day, and was found capable of supporting 4723 lbs. but gave way on the addition of 56 lbs. ∴ 4723—498 (weight required without the longitudinal bonds)=4225, the amount of strength gained by the use of iron bonds.

No. 3 gave way with the pressure of between 400 and 500 lbs. There was nothing remarkable in this experiment.

The above experiments were necessarily imperfect, the power not being applied as it would be in practice; for it is evident, that with a wall of from 10 to 15, or even 20 feet of solid work, the pressure, instead of acting merely on the centre, would be diffused throughout the whole beam. Upon clearing away the bricks from the middle of No. 2 beam, the two lower bars were found drawn asunder, the middle one remained of the same length, and the upper pair found, what is called buckled, or folded on themselves, showing the neutral centre to be in the middle bar.

We may take this opportunity to observe, that the foundations of the new Judges' Chambers in Chancery Lane, are being constructed after the manner of the beam No. 2, having a length of hoop iron to every row of bricks, and bedded in Roman cement.

On Monday some further experiments were made by Colonel Pasley at Chatham, in the presence of the heads of the Naval and Military departments there, and many scientific gentlemen, upon the strength of cement. The first experiment was to ascertain whether a safe staircase might be made with artificial stones formed with bricks and tiles, and other small materials united with pure cement, strengthened by hoop iron bond.

A portion of the brick beam used in No. 2 experiment detailed in our last Number, in length 4 feet 4 inches, was inserted 9 inches into the wall of a stable; it consisted of four courses (two more than is used in a geometrical staircase;) the extreme end of this step had no support whatever, so that we had the novel exhibition of a horizontal column of brick, retained together by cement and iron bars. Being loaded, it sustained the weight of 3566 lbs. Beneath the extreme end of the beam was placed a block to break the fall; when the weights were removed, and the block withdrawn, the column remained at the angle at which it fell, and required great purchase to remove it finally from the wall. Not one of the iron bars had given way.

The second experiment was for the purpose of ascertaining the force with which the hoop iron strengthened the brick beams, by weights acting on a piece of hoop in a state of tension. In this case a piece of hoop iron, 12 inches long, similar to that used in the above experiment, sustained a weight of 6163 lbs., then yielded with a fair fracture; it was elongated $\frac{1}{8}$ of an inch, and its temperature sensibly increased.

The third experiment was upon the remaining portion of the brick beam, built with Halling lime mortar, and strengthened with hoop iron, which was broken on the 28th ult., but one end of which was little injured. This beam was placed across two piers two feet asunder, so that the bars had very little room for extension; the experiment, however, was remarkable, for the beam sustained the weight of 4887 lbs. It did not give way suddenly; two bricks fell from the lower course many minutes before the final crash, and this did not occur till it had been yielding with a slow gradual motion. The fall was so tremendous that one of the piers were overturned, and scarcely two bricks were found together. So much for mortar. None of the bars were broken in this experiment.

It appeared in these experiments that the iron was corroded in the mortar, but not in the cement, another security of the latter over the former

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IMPROVEMENT IN THE JACQUARD LOOM.

A great improvement has just been effected in the jacquard loom, by which all the weights are dispensed with, and steam power is used to work the machinery. By this new machine silks of any pattern, of superior texture to the French, of the most even fabric, can be made by children or women. Springs are used to regulate the yard beam without reference to its diameter, and by a simple and ingenious contrivance, the yarn and cloth beams can be instantly stopped should the weight break.—*Ib.*

BRUSSELS IMPROVEMENT SOCIETY.

A company has just been formed under the name of "Civil Society for the Enlargement of the Capital of Belgium." The object of this new company is to build new quarters within or without the city of Brussels, particularly a quarter between the Louvian and Namur gates, to be called the Quarter Leopold. The affairs of the society are to be managed by seven directors without salary, and a secretary.—*Brussels paper.*

THE ELGIN MARBLES AND THE PUBLIC TASTE.

In the report of the parliamentary committee on arts and manufactures, it is recommended that casts of the best specimens of sculpture be transmitted from the metropolis to other towns, at the lowest possible cost, in order to facilitate the formation of galleries at various institutions, and thereby disseminate good taste. This object has been opportunely advanced by the request of the French government to ours, for permission to have the Elgin marbles cast for the benefit of their national exhibitions. It was not considered advisable to trust the operation to any but the moulder usually employed by the British Museum; but, in order to meet the wishes of our enthusiastic neighbours, Mr. Sarti has received orders to cast those valuable remains of antiquity; and the recommendation of the committee on arts is to be carried into effect by the sale of copies of those admired relics of Grecian taste, at the price of plaster and labour. This looks like encouragement to taste, and it is hoped that the managers of literary and scientific institutions will not neglect the advantage offered.—*Sunday paper.*

Correspondence of the N. Y. Daily Express.

FROM EGYPT.

Extract of a letter from an American gentleman, now travelling in the East, to a friend in this city, dated

Grand Cairo, Nov. 10, 1837.

You will no doubt be greatly surprised to receive a letter from me dated at this distant part of the globe, but accident more than design is the cause of my being here. On my reaching Malta, I found the communication to Egypt so rapid by the British steamers to Alexandria, that I determined to extend my travels altogether in a different course from that originally intended, and you need not be surprised should my future letters be dated at points unthought of by me and our friends, when I left the United States—I am now entirely undetermined whether I shall proceed by steamboats up the Nile into Nubia, and even into Abyssinia, or go down the Red Sea into India. Cairo is now becoming one of the most important cities in the world. It bids fair under the present enterprising Pacha, to rival its ancient splendor. In former times, when the navigation round the Cape of Good Hope was unknown, the whole commerce between the African shores of the Mediterranean, and Persia, Arabia and India, was carried on by immense caravans, through Cairo to Suez. For many ages past this intercourse has greatly ceased. The present Pacha of Egypt is a man of extraordinary character, and would be deemed such in any country. As an evidence of his energy and liberal spirit, he has offered every facility to the English, to extend through his dominions their line of communication with India. He has a steamboat of his own, called the Egyptian, running from here into Upper Egypt. She arrived here a few days ago from Miniah, full of passengers, a distance of two hundred and fifty miles up the Euphrates.

The route is now so easy compared with what it was a short time since, when, aside from employing guards, travellers were compelled to go on camels and asses, or in small boats—that I may take a steamboat to Nubia and pass on to Thebes. But before I travel north or east, I must say something in relation to this, which has been termed throughout the east, the queen of cities, and has no rival either in Egypt or Arabia. The grand city it is called, in contradistinction to old Cairo, is surrounded by high walls, with magnificent gates. The streets narrow, dark and winding. The principal street traverses and winds through the whole city. No pavements, and the consequence is, that the dust which is raised by the crowds of men from all countries, and camels and asses which pass through them, is most annoying. The houses are from two to three stories high, but being lighted from the courts within, and then walled up on the street, present a dark and prison-like appearance. There are, however, open squares upon which are built some very fine dwellings. The baths, the great places of resort, are tombs of the Mamelukes, are of marble, and being painted with gilded domes, have a most magnificent appearance. The Pacha resides in the citadel, which is said to have splendid apartments. The population is supposed to be from two to three hundred thousand, but no correct enumeration can be given. There is probably no place on the globe where the population is more transient. Thousands are on the move constantly, to and from Africa into Asia, and from the shores of the Mediterranean into Upper Egypt. I have not had time to attend to the sale of the male and female slaves that are exhibited in the street, of them I shall write to you in my next.

I fortunately reached here just in time to witness a scene of extraordinary gaiety and feasting. It is called the Feast of the Circumcision, and has lasted for the last eight days. On this occasion nearly two thousand children, including the sons of Pachas and men in the highest offices of the government, have been circumcised. The ceremony, or operation, was performed in the most public manner, and subject to the gaze of the crowd. At the palace, hundreds of camel loads of provisions were cooked for the thousands and thousands that attended. Fireworks of the most brilliant description were set off, and a large amount of money distributed to the crowd. All has been music, dancing, &c.

Should I pass into Upper Egypt, I will endeavour to give you a description of the wonderful ruins of tombs, and temples of ancient times, and of the Pyramids, which are in fact among the greatest wonders of the world. The British steam vessel Atalanta, is running regularly from Suez to Bombay. She stops at a number of places in Arabia, on the shores of the Red Sea, and at Mocha, and passes through the Straits of Babelmandel into the Indian Ocean. This is the new route for travellers, and no doubt will be taken by many English as well as Americans.

Yours, &c.

ACOUSTIC TELEGRAPH.

A new telegraph has been invented in Austria by a M. Kfeninger. It is an acoustic telegraph, consisting of a tube in the form of a speaking trumpet six feet five inches long, which conveys the sound in 11 and 1-10th seconds to a distance of 12,000 feet. A trial made of this instrument at Vienna proved very satisfactory. The government intends to employ it in the army for the purpose of conveying military orders to troops dispersed over a great tract of land, &c.—*National.*

The first trip of the cars on the Detroit and St. Joseph's Railroad was to be made on the 3d inst. The road is completed from Detroit to Ypsilanti, thirty miles.—*Commercial Adv.*

EGYPTIAN MODE OF MOVING COLOSSI.

In the King's library at Berlin is an interesting papyrus representing the Egyptian mode of moving Colossi. The Sphynx being upon a sledge, the first line of laborers are placed very close to it, and the rope is ramified, after passing under each man's arm, so that every rank in advance doubles the number in the former line, just in the way that foreign heralds exemplify quarters of descent. A drummer appears to be giving time for a simultaneous pull, a process facilitated by several attendants pouring oil where the tire of the sledge is about to pass. The latter circumstance would lead to the supposition that Egypt in prosperity was not deep in sand, as at present, or else that the ingenious inhabitants used a temporary railroad for conveying their prodigious monuments, the oil alluded to being poured upon the flange or groove that received it. The former may perhaps, solve the means by which the huge stones at Stonehenge and other ancient monuments in this country were placed in their situations.—*Lon. Mchanic's Mag.*

IMPORTANT INVENTION.

We have been informed that there is to be seen at the iron foundry of Messrs. Baugher & Wolf, of this borough, something new in the matter of wheels for railroad cars. It is an invention by Mr. Wolf of that very useful article, on a principle which we believe is entirely new, and, although it has not yet been tested, promises fairly to be a valuable matter with respect to the preservation of property and human life. It is a cast iron wheel without spokes, of about the same shape as the common Railroad car wheel—hollow in the middle—the outer side or rim convex—weighing but about 30 pounds more than the common wheel, and so strong that a friend of ours, who tried the experiment, assures us that, although accustomed to quarrying heavy stone, he could not break it by a succession of *bona fide* beatings with a sledge hammer. Numbers of other persons have tried it with the same success. Many accidents have occurred in consequence of the incapacity of the wheels of Railroad cars to sustain the weight with which they are burthened, and we trust that this invention (for such we believe it is,) may prove a sufficient preventive against any thing of the kind.—*Columbia (Pa.) Spy.*

PRIVATE ENTERPRISE.

The Miner's Journal, as an argument against the incorporation of a coal mining company at Pottsville, states as a fact, three individual coal operators have mined a greater amount of coal during the last season, than the aggregate quantity of the three coal companies in that region combined, with capitals amounting to about six hundred thousand dollars; and that these men came to that region, a few years since, with little or no capital.—*Commercial Journal.*

POETRY.

THE MILL'S MERRY SAIL.

BY MISS ELIZA COOK.

Oh! would that the days would come back to me,
When I rose with the lark, and rov'd with the bee;
When my father's fields, and the rustling grain,
Seemed wide and rich as a King's domain;
When I drank sweet draughts from the clover's breath,
And bound my brow with the wild rose wreath;
While the swinging flail, and the Mill's merry Sail,
Rung to the barn, and whirl'd in the gale.

Oh! could I ask back, and choose from all
The days I have had, 'tis those I would call;
There was warmth and fre-fineas then in my heart,
For I walk'd the world in its brightest part.
Oh! give me again those precious hours
When I slept in the corn-shock, and played with the flowers
While the swinging flail, and the Mill's merry Sail
Rung in the barn and whirl'd in the gale.

THE WEE FLOWER.

A bonnie wee flower grew green in the wuds,
Like a twinkling wee star amange th clouds;
And the larger it levit, the greener it grew,
For 'twas lulled by the wind, and fed by the dew.
Oh, fresh was the air where it reared its head,
Wi' the radiance and edcom its young leaves shed.

When the morning sun rose frae his eastern ha',
This bonnie wee flower was the earliest of a'
To open its cups sealed up in the dew,
And spread out its leaves o' the yellow and blue.

When the winds were still, and the sun rode high,
And the clear mountain stream ran wimpling by,
When the wee bird sang, and the wilderness bee
Was floating awa' like a cloud ower the sea,
This bonnie wee flower was blooming unseen—
The sweet child of Summer—in its rokely green.

And when the night clud grew dark on the plain,
When the stars were out and the moon on the wane,
When the bird and the bee had gane to rest,
And the dews of the night the green earth press'd,
This bonnie wee flower lay smiling asleep,
Like a beautiful pearl in the dark green deep.

And when Autumn came, and the Summer had pass'd,
And the wan leaves were strewn on the swirling blast,
This bonnie wee flower grew naked and bare,
And its wee leaves shrank in the frozen air;
With darnel and nettle sprang rank, from the ground,
But the rose and white lilies were drooping around;
And this bonnie blue flower hung down its wee head,
And the bright morning sun flung his beams on its bed,
And the pale stars looked forth—but the wee flower was dead.

A MUNIFICENT LEGISLATURE.

The Legislature of Tennessee has just closed its biennial session, the measures of which, it is truly remarked by the Nashville Whig, render it one of the most important and interesting that has been held for many years past.

First among the important measures of the late session stands by common consent, the establishment of the BANK OF TENNESSEE, (a *State* Bank) connected as it is with the magnificent appropriation of $4,000,000 to works of INTERNAL IMPROVEMENT, and $100,000 per annum to COMMON SCHOOLS.

Among the funds which will constitute the capital of the State Bank, are about one million and a half of dollars, received on account of the surplus Revenue; and the proceeds of the sales of the valuable lands in Oconee district, acquired under the Cherokee treaty of 1836.

The State interest in works of Internal Improvement was apportioned by an appropriation of $650,000 to the Charleston and Cincinnati Rail Road; $650,000 to the Hiwassee road (running from the Georgia line to Knoxville;) $1,600,000 to roads in Middle Tennessee, and $1,000 000 to roads in the Western District; and in addition to these appropriations, $300,000 were apportioned to the improvement of the navigation of the rivers in each of the three divisions of the State. To ensure the prompt payment of the interest on the bonds to be issued by the State for purposes of Internal Improvements to enable the road companies to realize the investment without difficulty, the Bank of Tennessee was made the fiscal agent of the State.

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One of this construction which might be called the "Novelty," passed us yesterday on Main street, composed, in part, of eight oxen, one horse and three mules, forming according to the best estimate we could make, a twelve horse power, sufficient on the rail way, to move one hundred tons at the rate of ten miles an hour, while here the power was expended in moving three tons at the rate of two miles an hour, which is not far from the average velocity of our improved locomotives when under full headway.—*From the St. Louis Argus.*

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NEW-YORK FARMER.

NEW-YORK, OCTOBER, 1837.

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The following very just remark was made by a distinguished lawyer in relation to the statement of J. L. L.'s small farming, which was published in our last number.

"If such things can be done with a piece of ground not exceeding a lot and a half, and that too with labor before *sunrise*, the rest of the day being applied to other pursuits, it will follow, that with us none but indolent and intemperate men *can* be paupers."

MADDER.

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The communication promised by him in relation to the culture of this valuable root, is deferred for a short time, until he can obtain from others, who are also engaged in its cultivation, the results of their past year's experience.

On the receipt of communications from Mr. Bishop, or others, on the subject, we shall take pleasure in laying them, at an early period, before our readers.

We would publish his letter now before us, referring to the cultivation of Madder, but for the word "*Private*" on its margin, and the hope that a short time will furnish us with a more detailed statement of Mr. Bishop's experiments and investigations.

POPPY SEED OIL.

We have again the pleasure of calling attention to this subject, by giving another interesting communication from Mr. L. Bishop, of Sauquoit, Oneida County, N. Y. In this communication, Mr. B. speaks with the aid of another season's experience, as to its cultivation, and refers particularly to the value of its medicinal qualities.

With the communication from Mr. Bishop, published in the semi-monthly number of the Farmer, dated May 29th we acknowledged the receipt of several capsules of seed, a part of which we distributed to friends in the county, and of the balance planted a small quantity, but from the lateness of the season, (last of May) or some other cause, the seed did not vegetate; therefore, we cannot speak of our own success in a first experiment.

By this communication it will be perceived that the *seed* may be obtained at the seed store of Mr. W. Thorburn, North Market-street, Albany, and we should be pleased to learn that it has all been sold; and also to hear from those who purchase the seed, when they shall have in their turn seed to sell.

This communication has been for a long time on hand, but delayed by the suspension of the publication of the Farmer.

For the New York Farmer.

In compliance with my promise in a former communication on the subject of poppy seed oil, I now send you the results of some further experience in the cultivation of the seed. It seems to be fully settled that the poppy, in order to produce the greatest quantity of seed per acre, should have a very rich soil. There is no danger of its having too rapid a growth, as each plant seems to increase the number and size of its seed capsules, in proportion to the richness and mellowness of the soil. The directions for giving the seed a uniform depth of covering, must be strictly adhered to, in order to secure a simultaneous maturity of the seed capsules. The selection and preparation of ground for sowing my poppy seed this season was made with a view of testing the superiority of a very rich soil over one of moderate fertility—one portion having been highly manured with a compost of pond mud, sand, and barn-yard manure—the other having no manure applied. On the manured portion, the growth of the plants was not only more vigorous and rapid, as might naturally be expected, but (with equal advantages of space) each plant produced a greater number, and larger sized seed capsules than upon the unmanured portion. One object with me in the cultivation of the poppy, the season past, has been to ascertain how great a quantity of seed per acre the cultivator may safely calculate upon, from a rich soil, giving to the crop the advantages of cultivation mentioned in my former number. Another object has been to determine whether the greatest aggregate amount of seed capsules, (and consequently seed) a square rod or more of ground can be made to produce, depends more upon the *richness* of the soil than upon the *space* each plant is allowed to occupy, as the distance between the plants is made to diminish from 8 to 10 inches each way. My seed was sown in drills 8 inches apart, and the plants suffered to stand from 2 to 10 inches in the drill. The average number of seed capsules to the single plant fell short of my former estimate, but upon the manured portion of the ground it was greater by nearly one-half than upon the other. Plants standing singly upon the unmanured ground, yielded three times the number of bolls each to those standing compact upon the most fertile part of my ground. I am in favor, however, of sowing the seed as formerly mentioned, as in that case the plants soon occupy all the ground, and effectually prevent the growth of weeds and grass, and save the labor of tilling. In this case the ground should be made very rich by manuring, if not otherwise, so I am confident, however, that the sandy lands between Albany and Schenectady would yield a profitable return from this crop without any cultivation or manuring, with the exception of *plaster of Paris*. On such sandy, barren soils, each plant ought to have a space of twelve inches square. The seed may be sown late in the fall, or even in the winter season when the ground is not frozen, or early in the spring, and the crop left to take care of itself, with the exception of the use of gypsum once or twice in the season. My crop of the poppy yielded this season only at the rate of 57 bushels to the acre—a much smaller quantity to be sure than was *theoretically* given in my former communication. But it must be

POETRY.

THE MILL'S MERRY SAIL.

BY ROSE ELIZA COOK.

Oh! would that the days would come back to me,
When I rose with the lark, and rov'd with the bee;
When my father's fields, and the rustling grain,
seemed wide and rich as a King's domain;
When I drank sweet draughts from the clover's breath,
And bound my brow with the wild rose wreath;
While the swinging flail and the Mill's merry sail,
Rung to the barn, and whirl'd in the gale.

Oh! could I ask back, and choose from all
The days I have had, 'tis those I would call;
There was warmth and fre-fluess then in my heart,
For I walk'd the world in its brightest part.
Oh! give me again those precious hours
When I slept in the corn-stack, and played with the flowers
While the swinging flail, and the Mill's merry sail,
Rung in the barn and whirl'd in the gale.

THE WEE FLOWER.

A bonnie wee flo wer grew green in the wude,
Like a twinkling wee star amongs th cloude;
And the larger it leevit, the greener it grew,
For 'twas hulled by the wind, and fed by the dew.
Oh, fresh was the air where it reared its head,
Wi' the radiance and aroom ha young leaves shed.

When the morning sun rose frae his eastern ha',
This bonnie wee flower was the earliest of a'
To open its cups sealed up in the dew,
And spread out its leaves o' the yellow and blue.

When the winds were wild, and the sun rode high,
And the clear mountain streams ran wimpling by,
When the wee bird sang, and the wilderness bee
Was floating awa' like a cloud over the sea,
This bonnie wee flower was blooming unseen—
The sweet child of Summer—in its rokely green.

And when the night clud grew dark on the plain,
When the stass were out and the moon on the wane,
When the bird and the bee had gane to rest,
And the dews of the night the green earth prest'd,
This bonnie wee flower lay smiling asleep,
Like a beautiful pearl in the dark green deep.

And when Autumn came, and the Summer had passed,
And the wan leaves were strewn on the swirling blast,
This bonnie wee flower grew naked and bare,
And its wee leaves shrank in the feden air;
Wlth darnel and nettle sprung rank, from the ground,
But the rose and white lilies were drooping around;
And this bonnie blue flower hung down its wee head,
And the bright morning sun flung his beams on its bed,
And the pale stars looked forth—but the wee flower was dead.

A MUNIFICENT LEGISLATURE.

The Legislature of Tennessee has just closed its biennial session, the measures of which, it is truly remarked by the Nashville Whig, render it one of the most important and interesting that has been held for many years past.

First among the important measures of the late session stands by common consent, the establishment of the BANK OF TENNESSEE, (a *State* Bank) connected as it is with the magnificent appropriation of $4,000,000 to works of INTERNAL IMPROVEMENT, and $100,000 per annum to COMMON SCHOOLS.

Among the funds which will constitute the capital of the State Bank, are about one million and a half of dollars, received on account of the surplus Revenue; and the proceeds of the sales of the valuable lands in Ocoee district, acquired under the Cherokee treaty of 1836.

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recollected that we were not then in possession of facts drawn from that kind of *practical experience*, which ought always to be the basis of our calculations when we recommend new agricultural pursuits to the public as a matter in which dollars and cents are concerned. In regard to the quantity of oil a bushel of poppy seed will afford, I have to depend on the testimony of Mr. Markum, who obtained a patent some 10 years since for manufacturing and using it.

This gentleman says that one bushel of the seed will produce three gallons of oil, and that the oil cake will pay the expense of manufacturing—it being very valuable for feeding all kinds of farm stock. The medicinal qualities of the poppy oil are highly spoken of by those who have had an opportunity of using it.

I do not propose to say much at present on this subject; but a few facts have come under my observation which may not be uninteresting to your readers. In all cases of great irritation of the mucous membrane of the stomach and bowels—whether in the form of dyspepsia, chronic gastritis, or dysentery (bloody flux)—it may be used in doses from one teaspoonful to half a gill, frequently with great benefit.

Last fall, a gentleman laboring under the very worst form of chronic gastritis, obtained from me a small quantity of the poppy seed to be used as an article of diet. It was bruised in an iron mortar, on account of the loss of his teeth by mercurial medicines, and then eaten freely with the most happy effect. When he had exhausted the small quantity of seed I was able to spare him, he insisted on having some of the oil cake from which the oil had been expressed. This he continued to take with much benefit.

Children are extremely fond of this seed, and should be allowed and encouraged to eat it in preference to most of the oily nuts found in our markets, especially when any unusual irritation occurs in the bowels. In the incipient stages of all those numerous gastric affections among children, and (especially in our cities) which are so apt to result in general sympathetic fever of a character resembling some of the numerous grades or varieties of *scarlet fever*. The free use of the poppy seed, or the oil administered as a medicine, would be a *preventive*, at least of more value *often* than the regular prescription of a physician. I did not intend saying half as much on the medicinal properties of this article as I have done. It is to be hoped, however, that medical men will give this article a favorable notice, whenever it appears in market. N. Witherell, Esq., of Albany, has ordered some of the seed, at the same time requesting that I would send some to Mr. Thorburn, seed dealer, of that city, for sale. I have accordingly forwarded a box to him, where it can now be obtained. It is said this article is in great demand among portrait painters, and that the present price is four shillings per pint. Of the truth of this I cannot speak, not knowing any thing of its value in that particular branch of the fine arts; but from the fact that its peculiar fluidity remains apparently the same at 10 or 15 degrees below zero as at summer heat—it will readily appear that for many uses it must have a decided superiority over other oils.

Respectfully yours,

S. Bishop.

We are indebted to Mr. Perrine for this article, and should be happy to receive more of his valuable communications.

NEW ZEALAND FLAX LILY.

Curtis's Botanical Magazine, Dec. 1st, 1832. *Phormium tenax. Thunb. Diss. Nov. Gen. p.* 94. *First Gen. n.* 24. *Prodr. p* 325. *Cook. Voy. v.* 2 *p.* 96, *cum. Ic Thouin in Ann. du Mus. v.* 2, *p.* 228, *et* 474. *t.* 19. *St. Fond v.* 19, *p* 401 *t.* 20. *Redoubt. Liliac, t.* 448-449. *Ait. Hort. Kew. ed, 2. v.* 2, *p.* 284. *Schult. Syst. Veget. v.* 6, *p.* 621. *Spreng. Syst. Veget. v.* 2, *p* 76.

Description.—*Root* fleshy, forming a somewhat tuberiform root-stock, creeping beneath the surface of the soil, and sending up many tufts of luxuriantly growing *leaves* from four to eight feet long, and from two to four inches in diameter. They are distichous, vertical, coriaceous, deep green, somewhat glaucous beneath, finely striated, ensiform, the margin and nerve, especially at the backs, are reddish orange; at the base the inner edge has a deep furrow, which sheathes the leaf immediately within it, and upon various parts of the surface a gummy substance flakes off in white spots or scales.

From the centre of these tufts of leaves arises a *scape*, "12 ft. high, with 13 branches, of which the lower ones contain about 20 flowers, and the upper ones a less number in gradual diminution as they ascend to the top" These flowers are panicled and secund, ascending or pointing upwards; the *peduncles* and *pedicils* rounded, glabrous, often tinged with purple, and sheathed with scales or bracteæ *margined* with red

The lower flowers of the branches seem to be very generally abortive and deciduous, breaking off at an apparent joint; the upper ones bear almost ripened capsules, while many of the former are still in full flower, and these capsules are oblong, tuquetious, brown and wrinkled, attenuated slightly at the base, and surrounded by the withered stamens and floral coverings, acuminated at the extremity, and terminated by the persistent but withered style, somewhat fleshy, three celled, each *cell* bearing numerous. compressed, imbrecated and erect seeds, inserted upon the inner angle of each cell.

In Cook's first voyage, Sir Joseph Banks discovered this highly useful plant. Speaking of the productions of New Zealand, he says: "But among all the trees, shrubs and plants of this country, there is not one that produces fruit, unless a berry, which has neither sweetness nor flavor, and which none but the boys took pains to gather, should be honoured with that appellation. There is, however, a plant that serves the inhabitants instead of hemp and flax, which excels all that are put to the same purposes in other countries. Of this plant there are two sorts: the leaves of both resemble those of flags, but the flowers are smaller and other clusters are more numerous; in one kind they are yellow, and in the other a deep red. From the leaves of these plants, with very little preparation, the natives make all their common apparel; and they also manufacture their strings, lines and cordage for every purpose, which are so much stronger than any thing we can make with hemp, that they will not bear a comparison. From the same plant, by another process, they draw long slender fibres, which shine like silk and are as white as snow; of these, which are also surprisingly strong, the finer clothes are composed; while of the leaves without any other preparation than splitting them into proper breadths, and tying the strips together, they make their fishing nets, some of which are of an enormous size. A plant with which such advantage might be applied to so many useful and important purposes, would certainly be a great acquisition to England, where it would probably thrive with very little trouble, as it seems to be hardy and to affect no particular soil, being found equal in hill and valley, in the dryest mould and deepest bogs. The bog, however, it seems rather to prefer, as near such places we found it to be larger than elsewhere."

The seeds brought home by Sir J. B. in 1771, did not succeed; but the N. Z. Flax Lily was introduced to the Royal Garden at Kew, through the medium of the same enlightened individual in 1789; and thence has been liberally distributed to collections in England and on the Continent. Mr. Aiton sent it to the garden of the Museum of Natural History of Paris in 1800; has been cultivated in the open air of many districts, and first produced flowers in the Department of *Drôme* 1812, but it bore no fruit. Messrs. Labillardiere, Faryas de Fond, Desfentaines and Freycinet have devoted much attention to the cultivation and manufacture of this plant. It has even withstood the severe winters of Paris, but in the South of France it has been propagated with considerable success, and survived the winters without the smallest protection. In the departments of the West, particularly in the environs of Cherbourg, it has perfectly succeeded and yielded ripe fruit.

It is readily increased too by dividing the roots Allan Cunningham, a very intelligent botanist and traveller, gives the following account of the Flax Lily.—"The Phormium tenax is indigenous to the Islands of New Zealand. On the northernmost of the Islands [Equaterward] which has been traversed almost in every direction by Europeans, it is

found in greater or less abundance, as well on the immediate coasts in low situations, subject to be overflowed by the tide, as in the inland country, generally, in grounds more or less swampy. Extensively diffused as this valuable plant is over the surface of the Island, it is along its western coast to the southward of the parallel of 35°, and in Cook's Streight, that the greatest quantities have been found, where it is said to grow in fields of inexhaustible extent. The indigenous growth of the Phormium is not limited simply to New Zealand; for it was long ago discovered in a wild state at Norfolk Island, where it forms long tufts along the cliffs, within the influence of the salt spray rising from the heavy surfs which ever and anon lash the iron bound shores of that small but truly beautiful spot of the Pacific. The preparation of the Flax for their own use, or for exchange with Europeans, is effected by the native women; and their method of separating the silky fibre from the long flag-like leaf of the plant, of which it forms the under surface, appears simple enough. Holding the apex of a *recently cut leaf* between their toes, they make a transvere section through the succulent matter at that end with a *shell*, (which they still employ, although they possess every species of iron edge tool) and inserting the shell (said to be of the Genus Ostrea) between that substance and the fibre, readily effect its separation by drawing the shell through the whole length of the leaf. It is to be observed that the separation is always performed by those people when the vegetable *is freshly cut*; as the leaf contains a gum which causes the fibre to adhere more strongly when dry. Nor have the attempts of Europeans to extract the filaments from the leaf *by maceration*, been at all successful; the experiments that have been made at Sidney, showing that the large proportion of the succulent matter, (for so the failure was accounted for) rendered it impossible to effect the separation by decomposition in water, without *materially injuring the strength* of the fibre. Simple as appears this mode of separating the Flax from the leaf by a shell in the hands of those savages, still the European has not succeeded in his endeavors to prepare the fibre for himself either by *that* or any other means that have been tried; nor has any instrument or piece of machinery yet been invented to enable *him* to strip off and prepare this valuable filament for the English market. The Port Jackson Traders must still be dependent on the native women and their shells for the cargoes they obtain. The flax thus obtained by the merchants of Sidney, undergoes no heckling, cleaning or other preparation previous to its being shipped for the English market; but it is merely made into bales by being put into a press and screwed. It is manufactured into every species of cordage excepting cables, and Mr. Bigge, the Commissioner of Enquiry to New South Wales, observes in his Report, pp. 52–53, "that its superiority of strength to the hemp of the Baltic, has been attested both by experiments made at Sidney, and by one that was effected under his own observation in the King's Garden at Deptford."

An experienced captain of a merchant vessel who had been 35 years at sea, and many years in the trade between Liverpool and Mauritius, spoke much in commendation of the ropes made of the N. Z. Flax, having employed them in the ships he had commanded. He had proved its superiority to hemp in ropes upon which there is always a great strain on shipboard; such as stays, braces, tacks, sheets, &c. and such were the strength and elasticity (hence its value for *stays*) and durability of the fibre of the N. Z. flax the ropes could be made of less dimensions, and therefore more convenient to use than those of Baltic hemp required for the same purposes. A *new main sheet* (which in a cutter is a rope on which there is ever much stress) after a nine months voyage was still good and serviceable, whereas had the rope been made of Baltic hemp it would have been so worn by strain and friction, it would have been necessary to bend another for the return voyage of seven or eight weeks duration.

For many years past, some communication has been kept up by individuals residing at Port Jackson with the natives of New Zealand: but it is only of late that the trade in flax has been found to be a profitable speculation. Of this the merchants of Hobart's town and Launceston in Van Dieman's Land are now fully aware; and having had their attention turned to its advantages, they are beginning to prosecute it with ardor.

From the experiments of Mon. Labillardiere the relative strength of the New Zealand flax is as follows: the fibres of common flax broke under a weight of 11¾; of common hemp 16¾; and of the Lily flax 23$\frac{7}{11}$—that is, the New Zealand flax is nearly 50 per cent. stronger than common hemp, and fully 100 per cent. stronger than common flax. These *foliaceous fibres* possess also this further advantage over the *cortical fibres* of flax and hemp; that is, of a brilliant whiteness which gives them a satinny appearance, so that the cloths made of them need not be bleached by a tedious process, or through those other means by which the quality of flax and hemp is considerably injured. M. de St. Fond asserts that the fibres may be obtained from the leaves by boiling them in soap water. Twenty-five pounds of the split leaves tied in bundles are immersed into a sufficient quantity of water in which three pounds of soap are dissolved. They are all then boiled during five hours until the leaves are deprived of a tenacious gluten or of a gum resin; and then they are carefully washed in running water. To me it appears this must be an expensive process—yet as the recent accounts from France state that the whole expense of the mode now pursued to obtain these fibres does not exceed six francs the quintal, it seems that French Chemistry must have accomplished the desideratum which English mechanics have attempted in vain. Yankee ingenuity, however, has not yet been engaged in the invention of machinery to effect the separation of these foliaceous fibres by simple scraping only. It is true that the machinery will have to be more complicated than the simple apparatus which will suffice for the leaves of the Agaves, of the Bromelias, of the Yuccas, and of all other plants with flat sword-shaped leaves WITHOUT A MIDRIB. The leaf of the New Zealand flax lily not only has a midrib extending from base to apex, but also towards the butt the sides of the leaf are folded together, and hence simple machinery cannot be easily applied to scrape the entire leaf. Nevertheless, the simple splitting of the leaves into two divisions through the midrib may overcome this difficulty. The simple process of shell scraping by the natives is undoubtedly the very best of all to preserve both the strength and the color of these foliaceous fibres; and hence the high importance of an American invention to effect the same scraping by labor saving machinery. It is not however, absolutely essential that machinery shall be discovered to render the propagation of the flax lily profitable in Florida and in our Southern states. Its generic name alone, derived from Phormos, a basket, was given in allusion to one of the uses made of the entire leaves of the plant in its native country. All travellers have spoken with pleasure of the varied uses of the leaves by these rude people for domestic manufactures. Besides their baskets, their mats have excited many encomiums. Some mats are said to be of a peculiarly fine and glossy texture, with deep borders of various devices and different colors worked all round; the style of which, even to a Parisian belle, would appear chaste and fashionable. Even the dresses of the natives were made of those leaves, split into three or four slips, and when dry, interwoven into each other so as to form a kind of stuff between netting and cloth, with all the ends, eight or nine inches long, hanging out on the upper side, like shag or thrumb matting. They also made a sort of cloth as coarse as the coarsest canvass, but it was "ten times as strong." Immense fishing nets we have seen, are made by simply tying together slips of the leaves. Of the uses to which the entire leaves and slips of the leaves would be converted to in the United States, some idea may be formed by a reference to the ingenious industry of our country women in the manufactures of hats, bonnets, &c. from the leaves of palms and the stalks of grasses. From strips of the leaves of this flax lily, hats, bonnets, baskets, &c. would soon be made of much greater beauty, strength and durability than even the celebrated costly hats of Panama; and the price would be reduced proportionately as much as it

has been reduced in the price of similar articles now manufactured on the farms and in the families of the New England States, when compared with the sum at which they were sold when imported from other countries. Hence the propagation of this single plant alone on the worst soils of the Southern States, would not only cover them with a dense population of small cultivators, but might also triple that rural population by giving employment to their families in really domestic manufactures. At all events the numerous small cultivators of the South would thus be enabled to furnish the cheapest possible raw materials for the numerous small manufacturers of the North; and would thus create a mutually profitable and harmonious dependence of the great masses of population in both sections of the Union on each other.

The increase of the flax trade with the New Zealanders may be inferred from the following statistical facts. In 1828, the export of N. Z flax from Sidney to England was 60 tons, and valued at £2,600 sterling. In 1830, the same exports ascended to 841 tons; and in 1831 to 1062 tons, for the English market alone. That this flax lily can be profitably propagated throughout all our Southern States, may be inferred from the fact, that it is profitably cultivated in the Southern Departments of France, and from the still more decisive fact that it has flourished several years in the open air of Charleston, S. C. For my own part, I have not the slightest doubt that it may be spread over all the worst soils of the Southern and South-western States, especially in the pine woods, magnolia swamps, and other evergreen forests between the Potomac and the Mississippi. Should it not extend further inland than the live oak or within the influence of the saline atmosphere of the ocean, it merits to be spread over the whole extent of country heretofore covered with the live oak. At all events there is every human certainty that the territory of Florida is especially adapted to the flax lily, and that it might there be extended over millions of acres, as it is in its native New Zealand and Norfolk Island. My convictions of its certain success in Florida are founded on the descriptions of the climate and vegetation of New Zealand given by all travellers. Although these islands are situated between 34 and 48° S. L., yet as they are very narrow in proportion to their length, their temperature is more moderate and uniform, and the atmosphere more humid than would be inferred from their latitudes alone. In a voyage to New Zealand in 1814—15, by John Liddiard Nicholas, Esq., and Rev. Samuel Marsden, they say, in speaking of the Bay of Islands, lat. 35° S., "The climate was so salubrious and inviting, that even in the depth of winter no other change was perceptible than a few refreshing showers, which gave mellow and vernal softness to the fields, while no sudden or violent transitions ever disturbed the serenity of the mild atmosphere." Again on their excursions into the interior of the Northern Island, they remark, "there was one feature of the country which every where struck us with admiration, and that was the fine rich verdure of the landscape wherever we turned our eyes, and which gave us at the same time a high opinion of the genial influence of the climate." In Hawkesworth's Voyages, v. 3, p. 34, it is said, "From the vegetables found here there is reason to conclude that the winters are milder than those of England; and we found the summer not hotter though more equally warm. Of musquitos and sand flies a few were found in almost every place where we went ashore." In another place it is observed that the English vegetables left by Cook on his first voyage continued to propagate themselves, although many of them were too tender to survive a winter in the open air of England. The character of vegetation also confirms my opinions. Many New Zealand plants are such as are found within the tropics or on their borders. The shores in many parts are beset with mangroves; the interior is covered with arborescent ferns, and in many parts the woods are so over-run with supplejacks that it is scarcely possible to force one's way among them. Among the trees were observed two or three kinds of fern, like those of the West Indies. At Norfolk Island, where a sort of spruce pine trees are very large and very abundant, cabbage palms of ten to twenty feet high are also a spontaneous growth; and here the flax lily is still more luxuriant than in New Zealand. In New South Wales they give a decided preference to the flax lily of Norfolk Island both for quantity and quality.

But in both islands, whether in pine forests or undulating savannahs, whether on the seacoast or in the interior, on hills or in valleys, the flax lily flourishes in the greatest profusion as well in the most exposed as in the most sheltered situations.

Enough, however, I trust, has been said to prove that this flax lily can be propagated easily, at least throughout all Florida, and probably throughout all our Southern and South-western states. As the fields of France already furnish lily flax enough to afford employment in manufactories to several thousand workmen, it may be anticipated that the forests of Florida will furnish soon flax lily leaves enough to employ a million of family manufacturers.

HENRY PERRINE.

Washington, D. C. 19th Feb., 1838.

P. S. It is respectfully hoped that every person who may peruse this article will also read the documents on other fibrous-leaved plants now in the course of publication, with the reports of the committees on agriculture in the House of Representatives and Senate of the United States.

March 5th, 1838. H. P.

REPORT

Of the Committee on Agriculture, on the Memorial of the State Agricultural Convention assembled in Albany on the first day of February, instant, Reports:

Although the duties of the committee on agriculture have oftentimes been considered rather nominal than active, yet your committee, on a review of past years, and careful examination of the present condition of the State, have come to the conclusion that a serious responsibility, at this time, rests upon them; that they are charged with some of the highest duties which devolve upon the Legislature of a State; the guardianship of that primary branch of industry which is the source of our prosperity and greatness, and our sure dependence in times of public peril and misfortune. Politicians may speculate upon the influence which free institutions, or a partizan administration, may have upon the prosperity of a country; commercial men may extol the advantages of an extended foreign commerce; manufacturers may claim pre-eminence in conferring independence upon their country; and literature may arrogate the exclusive credit of rendering a community enlightened and polished; yet after all, agriculture constitutes the broad base upon which the whole superstructure of society depends for support. If that languishes, either for want of the protection and patronage of the constituted authorities, or from the inattention and lack of intelligence in its rural population, the government becomes embarrassed, commerce crippled, and manufactures paralyzed. A maritime war may sweep our commerce from the ocean; our manufactures may sink for want of a market for their fabrics, as they have done; but agriculture never disappoints our hopes, while we continue to enjoy the blessings of a kind Providence, whose favor it is alike our duty and our interest to propitiate, by prudent foresight and dutiful submission to all his requirements. The soil, under judicious management, never withholds the tribute of reward to those who humbly devote themselves to its culture, and place upon it their only sure reliance. Upon this, then, we ought to bestow our special attention, our protecting care. These truths have been amply illustrated and esbablished in the experience of the two last years. Your committee are persuaded that the condition of the agriculture of any country affords a safe criterion whereby to judge, not only of its general prosperity, but of the social and moral condition of its population.

The recollections of the age will serve to show, that the relative condition of our agriculture and that of many of the coun-

tries of Europe has undergone a remarkable change within the last forty years. While the latter has been increasing, ours has been diminishing in its products. About the commencement of the present century the exportation of bread stuffs and other provisions, from the northern and middle States, amounted annually, to twelve or fourteen millions of dollars, principally to the continent of Europe. In the two last years, instead of exporting provisions to Europe, as formerly, we have imported from thence bread stuffs to the amount of seven or eight millions of dollars. These facts conclusively show, that the agricultural products of Europe have greatly increased, while ours have been diminishing, in proportion to our population, notwithstanding the vast accession of fertile virgin soil which has been constantly enlarging our borders. Whence this great change but from a neglect, on our part, to nurture this great branch of national industry; and a diligent and constant endeavor, on the part of the governments and people of Europe, to improve it? We have the most ample evidence that the efforts of our contemporaries on the old continent have been crowned with abundant success. France and Germany have made great advances in agricultural improvement. The once barren sands of Brandenburgh, and the no less unproductive heaths of Prussia, are now covered, through the active efforts of the Prussian government, with plentiful harvests of the finest grain in the world. The soil of England has been made to more than double its products within the last sixty years; and Scotland has quadrupled her agricultural products since the termination of our revolutionary war.

While such has been the recent progress of agricultural improvement in Europe, what has been our progress in husbandry? Has it not been retrograde? Have not our cultivated lands been generally deteriorating, under an exhausting system of husbandry? and have not large tracts, once fertile, on the Atlantic border of our country, been absolutely abandoned, as unprofitable for culture, on account of the sterility produced by our bad husbandry?

Under the view of the subject which these facts present, the committee feel it their duty to press upon the consideration of the Legislature, who are delegated to take care of the public weal, an investigation into the causes which have led to this great, this alarming change, in the relative condition of the two continents; and to urge them to adopt prompt and efficient means, not to repress the European spirit, which has done so much good to the human family, but to transfuse a portion of that spirit into our own population, and to raise the character of our agriculture, as we can and ought to do, to the level of that of any country on the globe. Fortunately, we are not left in doubt as to the prominent means of effecting this desirable object. Other governments have made the experiment for us; have set us the example, and in a measure demonstrated the certainty of success. Those governments have patronized and aided this noble art, by protection and rewards; by instruction, in the primary schools, in the elementary principles of husbandry; by national boards of agriculture; by agricultural surveys, and by schools of scientific and practical instruction in the diseases and management of domestic animals, and in the business of agriculture generally.

The State of Massachusetts was among the first to encourage the establishment of agricultural societies, and to dispense to them the public bounty. Her continuing to persevere in this policy to the present time, by a renewal of the law making an annual and liberal appropriation to this object, is at once an evidence that she has found such expenditure salutary, and in perfect unison with the feelings and wishes of her enlightened population.

The State of Maine has also given an example of great liberality and wisdom, in recent efforts to improve her agriculture. The bounty which she this year pays to her citizens, to encourage the culture of wheat alone, will draw from the treasury a greater sum, than all the expenditures, which the "empire State" has made *directly* in aid of *her* agriculture, put together.

Several of the States have likewise, with a view to encourage a useful and lucrative branch of home industry, offered liberal bounties for the cultivation of the mulberry, and the production of silk. A slight reference to the proceedings of the current Legislatures of several of our sister States, at this moment, may show the position which our own proud State should assume on this important subject.

A bill is now before the Legislature of Massachusetts for giving a bounty to her citizens for the production of wheat.

A bill is in discussion in the Legislature of Kentucky to establish a board of agriculture, and State and county societies.

A bill is before the Legislature of Maryland to establish and patronize agricultural schools, &c.

The same is under consideration in the young and enterprising State of Michigan, for the establishment of State and county agricultural societies, with appropriations from the State funds for their support.

And even Wisconsin, that wild, though fertile and rapidly increasing territory of the great west, is engaged in the same laudable work.

Nor do we lack a useful lesson of instruction at home. The law passed in 1819, "to improve the agriculture of this State," did do what its title purported; it did improve the agriculture of this State. It improved our farm stock, our farm implements, our farm crops, and modes of culture; and it gave a new impulse to useful enterprize and improvement. And although the manner of its execution was in many cases faulty, as all new experiments are liable to be in the outset; yet it effected a great public good. That law involved a public expenditure of twenty-five or thirty thousand dollars, and no like sum, your committee are induced to believe, has been expended from the State treasury with greater public advantage. Its benefits are now palpable, and are acknowledged by all intelligent men. Indeed, it has been stated, upon no slight grounds, that the expenditure has been more than thrice returned to the treasury, in the form of canal tolls upon the extra products of the soil, which it virtually created.

There is another subject to which the committee deem it proper to call the attention of the Legislature. The insect denominated the grain worm, has, for several years been greatly destructive to the wheat crop in the northern and northeastern counties of the State. It is progressing south and west, and threatens to cut off, or at least seriously to diminish, the great staple of our soil, and the source of much of our wealth. If the attention of naturalists, and the critical observation of practical farmers, were directed to the character and habits of this insect, by offers of a liberal bounty for the discovery of an efficient preventive of its depredations, it is believed that great public benefit might result from the measure, while it seems certain that no injury could ensue from it.

Your committee believe that in all the arts of productive labor, and particularly in agriculture, it is highly important, to the attainment of excellence, to commence instruction in the primary schools. And as we now have published, in our State, agricultural journals of as high and useful character as are published in the world, and at a price less than one-fourth the cost of an equal quantity of matter in a book form, they consider their introduction into our common schools as occasional class books for our youth, a cheap and efficient means of improving both the mind and the soil.

From the best consideration which the committee have been able to give to the important matters which come within the purview of their duties, they have come to the unanimous conclusion, that the time has arrived, when the public interest, and the popular will alike require the exercise of legislative wisdom and legislative bounty, to improve the condition of our agriculture; the business, as has been already remarked, which gives employment to the mass of our population, and which is the main source of prosperity to all the other classes of society. The committee, therefore recommend that, with a view of promoting the desired improvement, a law be enacted to organize a State board of agriculture, and to establish agricultural societies in the several counties of this State; and that an annual expenditure of 25,000 dollars be authorized, for five years, with suitable provisions and under proper restrictions, to improve the agriculture of this State.

The committee have prepared a bill in accordance with their views upon this subject, and have directed their chairman to ask leave to present the same.

AN ACT TO IMPROVE THE AGRICULTUR OF THIS STATE.

The People of the State of New York, represeneted in Senate and Assembly, do enact as follows:

§ 1. That the sum of twenty thousand dollars per annum shall be, and hereby is appropriated, for the term of five years, for the promotion of agriculture and household manufactures, in the several counties of this state, in the manner following, to wit: To the county of Albany five hundred and twenty-one dollars; to the county of Allegany, three hundred and forty-eight dollars; to the county of Broome, one hundred and seventy-four dollars; to the county of Cattaraugus, three hundred and forty-eight dollars; to the county of Cayuga, five hundred and twenty-one dollars; to the county of Chautauque, five hundred and twenty-one dollars; to the county of Chemung, one hundred and seventy-four dollars; to the county of Chenango, five hundred and twenty-one dollars; to the county of Clinton, one hundred and seventy-four dollars; to the county of Columbia, five hundred and twenty-one dollars; to the county of Courtland, three hundred and forty-eight dollars; to the county of Delaware three hundred and forty-eight dollars; to the county of Dutchess, five hundred and twenty-one dollars; to the county of Erie, five hundred and twenty-one dollars; to the county of Essex, one hundred and seventy-four dollars; to the county of Franklin, one hundred and seventy-four dollars; to the county of Genesee, six hundred and ninety-five dollars; to the county of Greene, three hundred and forty-eight dollars; to the county of Herkimer, three hundred and forty-eight dollars; to the county of Jefferson, five hundred and twenty-one dollars; to the county of Kings, three hundred and forty-eight dollars; to the county of Lewis, one hundred and seventy-four dollars; to the county of Livingston, three hundred and forty-eight dollars; to the county of Madison, five hundred and twenty-one dollars; to the county of Monroe, five hundred and twenty-one dollars; to the county of Montgomery, five hundred and twenty-one dollars; to the county of Niagara, three hundred and forty-eight dollars; to the county of Oneida, six hundred and ninety-five dollars; to the county of Onondaga, six hundred and ninety-five dollars; to the county of Ontario, five hundred and twenty-one dollars; to the county of Orange, five hundred and twenty-one dollars; to the county of Orleans, one hundred and seventy-four dollars; to the county of Oswego, three hundred and forty-eight dollars; to the county of Otsego, five hundred and twenty-one dollars; to the county of Putnam, one hundred and seventy-four dollars; to the county of Queens, one hundred and seventy-four dollars; to the county of Rensselaer, five hundred and twenty-one dollars; to the county of Richmond, one hundred and seventy-four dollars; to the county of Rockland, one hundred and seventy-four dollars; to the county of St. Lawrence, three hundred and forty-eight dollars; to the county of Saratoga, three hundred and forty-eight dollars; to the county of Schenectady, one hundred and seventy-four dollars; to the county of Schoharie, three hundred and forty-eight dollars; to the county of Seneca, one hundred and seventy-four dollars; to the county of Steuben, five hundred and twenty-one dollars; to the county of Suffolk, three hundred and forty-eight dollars; to the county of Sullivan, one hundred and seventy-four dollars; to the county of Tioga, one hundred and seventy-four dollars; to the county of Tompkins, three hundred and forty-eight dollars; to the county of Ulster, three hundred and fifty dollars; to the county of Warren, one hundred and seventy-five dollars; to the county of Washington, three hundred and fifty dollars; to the county of Wayne, three hundred and fifty dollars; to the county of Westchester, three hundred and fifty dollars; to the county of Yates, one hundred and seventy-four dollars.

§ 2. That when an agricultural society shall be formed in any county, or in two contiguous counties, and the members thereof shall annually procure, or raise by voluntary subscription, any sum of money, the president and treasurer shall make and subscribe an affidavit of the facts of the formation of such society, and of their having raised a certain sum, specifying the amount thereof, which affidavit shall be filed with the comptroller of this state, who shall draw his warrant on the treasurer for a sum equal to double the amount of such voluntary subscription, not, however, exceeding the amount to which such county or counties would be entitled, according to the apportionment aforesaid.

§ 3. That the several agricultural societies which shall be formed in this state, during the continuance of this act, shall annually elect such and so many officers as they shall deem proper, all of whom shall be actually engaged in carrying on the business of farming; none of whom, however, shall receive any emolument from his office; and it shall be the duty of such officers annually to regulate and award premiums on such articles, productions and improvements, as they may deem best calculated to promote the agricultural and household manufacturing interests of this state; having especial reference to the nett profits which accrue, or are likely to accrue, from the mode of raising the crop or stock, or the fabrication of the article thus offered, with the intention that the reward shall be given for the most economical or profitable mode of competition: Provided always, that no individual shall receive more than two premiums at any anniversary meeting, nor more than one first and one second premium at any subsequent time upon the same animal, and that no person shall receive any premium from an awarding committee of which he is a member thereof: And provided further, that before any premium shall be delivered, the person claiming the same, or to whom the same may be awarded, shall deliver in writing to the president of the society, as accurate a description of the process in preparing the soil, including the quantity and quality of manure applied, and in raising the crop, or feeding the animal, as may be: and also of the expense and product of the crop, or of increase in value of the animal, with the view of showing accurately the profit of cultivating the crop, or of feeding or fattening the animal.

§ 4. That if an agricultural society shall not be organized in any county, or shall neglect to raise by voluntary subscription, a sum which shall entitle them to the apportionment made to said county by this act, the board of supervisors of said county are hereby empowered, at their pleasure, during the continuance of this act, to raise annually, in the manner the contingent charges of said county are required to be raised a sum equal to one-half the amount hereby appropriated to said county. And whenever the president of said board of supervisors shall certify to the comptroller that such board of supervisors have resolved to raise such sum, it shall be the duty of the comptroller to draw his warrant on the treasurer of the state, in favor of the treasurer of such county, for the sum appropriated for said county by the first section of this act.

§ 5. That it shall be the duty of the supervisors of every such county, to cause all the money so raised and received for agricultural improvement, to be paid and expended at an annual agricultural exhibition, to be held in such county, at such time as they shall appoint, in such manner as shall in their judgment best promote the legitimate object of this act, and subject to all the provisions contained in the third section hereof.

§ 6. That the several presidents of the said societies, and of the boards of supervisors, who shall receive or expend any of the moneys hereby appropriated, shall annually, in the month of December, transmit all such reports or returns as they are required to demand and receive, to the secretary of the state board of agriculture, hereafter named and organized, together with an abstract of their proceedings, exhibiting a detailed account of the expenditure of all the moneys which shall come into their hands under this act, and stating to whom and for what purpose paid, with the vouchers therefor.

§ 7. There shall be organized a state board of agriculture to consist of five members, who shall hold their offices for

five years from the second Tuesday of February, one thousand eight hundred and thirty-eight, and shall receive, while necessarily employed in the duties enjoined by this act, the same compensation as members of the legislature. They may choose such officers as they may deem necessary, and shall hold quarterly meetings in the city of Albany on the first Tuesdays in February, May, August and November; and may also meet at such other times as may be found expedient to fulfil the duties hereafter enjoined upon them.

§ 8. There shall be assigned for the meetings of the state board of agriculture, and as a museum for models, geological specimens, and agricultural productions, a suitable apartment in the state buildings now erecting; which room and museum shall be kept in order by the secretary, or by some person to be appointed by the board, and shall at all reasonable hours be open and accessible to the public without charge.

§ 9. It shall be the duty of the state board of agriculture to examine all reports and returns made by the presidents of the county agricultural societies, and boards of agriculture; to select, for publication, such of them, and such other essays as they may judge advisable; and shall annually publish a volume, to be distributed in the several counties of this state, by the county agricultural societies, or by the boards of supervisors thereof: And they shall examine, when in session, and determine by practical experiment on the merits of all new farm implements or machinery offered for their examination, and may award discretionary premiums, upon such as may be found truly meritorious and deserving of public patronage, provided the whole amount expended in any one year shall not exceed the sum of one thousand dollars for that purpose; and provided further, that no such premium shall be delivered to the person claiming the same, until he has deposited with the board a model of his implement, machine or improvement.

§ 10. There shall be deposited in the room assigned to the board, a complete set of mineralogical and geological specimens, properly arranged and labelled, from the collections now being made by the geological corps in the public employ; specimens of choice or rare agricultural productions, models of implements, drawings of choice animals, books, and other articles which may be presented to the museum, a registry of all which shall be made by the secretary, and open to the public inspection.

§ 11. The said state board of agriculture shall report annually to the legislature, in the month of January, a statement of their expenditures and of their proceedings during the previous year: and also all matters that they may deem calculated to promote the improvement of agriculture and of household industry.

§ 12. A reward of five hundred dollars shall be and is hereby offered to any person who shall discover and will communicate to the state board of agriculture, for the public benefit, a sure and efficient preventive of the depredations of the insect denominated the Grain Worm; the efficacy of the said preventive to be tested by the said board during at least one year, and satisfactorily confirmed before the said award shall be given; and if the discovery shall prove but a partial remedy of the evil, it is made discretionary with the said board, or a majority of them, to award such part of the sum hereby appropriated as its importance may seem to justify.

§ 13. That the treasurer of the state shall annually pay on the warrant of the comptroller to the said state board of agriculture, the sum of five thousand dollars to enable them to pay the aforesaid premium; to purchase and distribute such useful seeds as they may deem proper; to publish an annual volume, and to defray such other necessary expenses to promote the object of this act, as are not otherwise provided for; and the said board shall annually account with the comptroller for the expenditure of this money.

§ 14. That the presidents of the several county societies, or delegates to be chosen by them annually for the purpose, shall be ex-officio members of the New-York State Agricultural Society.

§ 15. The board of agriculture, constituted as aforesaid, shall have the authority in their discretion, to award premiums for the production of extraordinary and valuable crops of grain; beet root, and sugar manufactured from the same; mulberry orchards, and silk manufactured therefrom; or any other agricultural or horticultural productions or household manufactures, which in their view shall by such encouragement add to the productive wealth of the country, not exceeding, however, in amount, the sum of five thousand dollars hereby placed in their hands.

§ 16. The collectors of taxes in the several towns in the state of New-York are hereby required, while collecting the same, to ascertain, as near as may be in their power, the number of bushels of grain of different kinds, of esculent roots, and of hay produced during the current year in their respective towns, and the number of horses, cattle, sheep and swine then in existence, and report such amount to the board of agriculture in the city of Albany, on or before the first day of January in each and every year hereafter. Such report to be directed to "The state Board of Agriculture, Albany."

§ 17. The sum of twenty-five thousand dollars appropriated by this act shall be taken from the income of the surplus fund deposited with the state of New-York by the United States.

§ 18. The first board of agriculture shall consist of who are hereby appointed for the term of five years aforesaid, and all vacancies that may occur in said board shall be filled by joint ballot of both houses of the legislature at their annual session, to be held by the incumbents for the same period of time.

§ 19. The state board of agriculture shall procure of the agricultural periodicals entitled "The Cultivator," and "The Monthly Genesee Farmer," as many copies of each, commencing with the current volumes, as there are common school districts in the state, and shall cause as many copies of each to be addressed to the school commissioners of each town as there shall be school districts in the same; and it shall be the duty of such school commissioners to cause the said papers to be promptly distributed, one copy of each to the several schools, and of the trustees of said school districts to have the same properly taken care of, and to be used as occasional class books in said schools.

§ 20. The comptroller shall, on the requisition of the said board of agriculture, draw his warrant on the treasury of the state for the payment to each of the proprietors of the said agricultural papers for the number of copies so delivered, estimating each of them at fifty cents per copy; such payment to be made from the common school fund.

METAMORPHOSES OF THE MUSQUITO.

The musquito, (says Mr. Gilchrist, surgeon) has three stages of existence, in two of which it is a water insect; in the third, the well-known winged one.

I observed several musquitos on the surface of some stagnant water, each in close proximity to a yellowish substance, which, when viewed through the microscope, proved to be a collection of eggs which the musquitos were depositing; each collection, though not consisting of fewer than 100 eggs, did not exceed 3-20ths of an inch in length, and 1-20th in breadth. The eggs were arranged in lines standing on end, and were each 1-40th of an inch long.

A few of those collections of ova were placed, with some of the water on which they floated, into a tumbler, and placed under a glass shade. In two days and a half the water was found to swarm with animalcules, the shells of the ova were still adherent, as when first observed on examining one minutely, the larger or under end was found to have opened like a lid, to allow the insect to escape into the water.

The body of the newly hatched insect is semi-transparent. In the thorax the heart is seen furnished with four projections; from this organ two blood vessels proceeded down the centre of the body to the end of the tail, which is to be always seen just above the surface of the water, the animalcule having its head downwards.

Between the heart and the elongated tail an active circulation is to be observed, indicating probably that the latter

constitutes the lungs or gills, it being always above the surface of the water.

Its motion is quick, and it always goes tail foremost; when in search of food it throws out a couple of brush-like tentacula, which move circularly, and create a vortex, by which the food is attracted within the reach of the depredator. The food appears to be principally decomposing vegetable matter. They occasionally devour their own kind, and their recently quitted shells, &c.

At the termination of 21 days, during which the water was thrice changed, they had attained to three or four twentieths of an inch in diameter. On attaining this age they underwent a second metamorphosis. The shape is materially altered, but the greatest change is that which regards the seat of the gills.—These organs are now situated in the thorax, their former site, the tail being absorbed; and the channel of communication between them and the air consists in two small tubes attached to the upper part of the thorax. In this stage of existence the insects are much less active than in their former state. They do not require food, and have no mouth, resembling in this respect the chrysalis of the butterfly. They seldom leave the surface, and when they do so, speedily return to it.

The insects remain in this stage about 48 hours, towards the termination of which the legs and proboscis of the winged musquito can be plainly seen through the thin membrane that surrounds it. This in due course bursts, when the musquito draws itself out, stands on the surface of the water a few minutes, to dry and expand its wings, then flies to a dry situation.

If the musquito, in either of the two first stages, be then taken out of the water, it speedily dies, and it is as quickly killed by immersing in that fluid after becoming the winged insect.

We learn from the above details that the musquito is a most prolific insect, and that, as stagnant water is necessary to its propagation, all such ought to be kept as distant as possible from our dwellings. —*Madras Journal of Literature.*

PROSPECTS OF CHICAGO.

The boats that leave Buffalo for Chicago start with from 200 to 800 passengers, which they distribute throughout the Lakes. The price of passage from Buffalo to Chicago, in the cabin and found, is $25; deck passengers half price. The price of freight on board schooners is $1 per bbl bulk; on board steamboat it is $1 50.

The amount of various kinds of merchandise transported from the East, principally from the city of New York, may be estimated as follows for 1836:—Amount sold in Chicago say $1,000,000 —destined for the interior an equal amount.

Chicago will be connected with the waters of the Mississipppi by the Illinois and Michigan canal, now being constructed. The length of the canal is about 100 miles, 60 feet wide at top and 6 feet deep. Its estimated cost is $7,000,000. This canal is a State work and will be vigorously prosecuted. The U. S. have appropriated every alternate section of land for 5 miles, on each side of it, to aid in its construction. Its terminating points are Chicago, and Peru on the Illinois river. It will be supplied with water from Lake Michigan.

A large number of laborers are now and will continue to be wanted on the line of the Illinois and Michigan canal. $20 per month with board is the price which has generally been paid during the past summer, a portion of the time $26 per month was paid. Mechanics' wages are now about $2 per day at Chicago. Last year they obtained much higher prices. Labor of all kinds has always been in brisk demand.

The steamboat Michigan cost $69,000 —her gross receipts in 1836 were $75,000. The nett profit declared on her stock for that year was 50 per cent.—Her receipts for one trip from Buffalo to Chicago and back were $14,500. All the well managed vessels and steamboats on the Lake where no serious accident occurred are supposed to have paid an average profit of 50 per cent. on their cost in 1836.

Up to the spring of 1833 Chicago was simply an Indian trading post, occasionally protected with a small garrison of United States troops. At that time an appropriation was made for a harbor at the mouth of the Chicago river. This gave the first impulse to the growth of the place. It then contained about 300 inhabitants: last autumn it numbered about 5000.

The commanding advantages which Chicago possesses as a commercial position arise from the fact that it stands at the head of the great chain of American Lakes, at a point from which a water communication can be made with the waters of the Mississippi with comparatively little artificial navigation.—*Balt. American.*

ECONOMY OF LABOR.

One great superiority of the manufacturers of England over the agriculturists, is attributable to their attention to the economy of labor. In my earliest remembrance, the farmers were too ignorant to think of it, afterwards they were too prosperous, and now they are too much bent on seeking relief from other sources than their own energies. What might be done in time by a combination of mechanical and chemical science, it is as impossible to calculate beforehand, as it would have been fifty years since to have foretold what would be the present state of spinning, weaving, bleaching, and transport.—*Walker's Original.*

CHICAGO AND NEW YORK UNITED BY INTERNAL IMPROVEMENTS.

By the report and estimates of J. D. Allen, Esq., it is estimated by calculating Railroad speed at 17, and steamboat at 12 miles an hour, that the transportation of passengers can be effected, from New York via Albany, Utica, Oswego, &c., to Chicago, in sixty-one and a half hours, thus:

Distance and Time.

From N. Y. to Albany, 150 miles, by night boat,	10½	hours
" Albany to Oswego, 168 miles, by day Railroad,	10	"
" Oswego to Hamilton 160 miles, by night boat,	13½	"
" Hamilton to Detroit 191 miles, or to Huron, 136 miles, by day Railroad,	11	"
" Detroit to Chicago, and from Huron to Chicago, 250 miles, by day and night Railroad & steamboat,	16½	"
Total	61½	"

From Boston—time the same.

The report adds: "In a further time of ten hours, the traveller may reach the Mississippi, or some of its chief tributaries, in less time, and may complete the journey by the river to New Orleans, within eight days from his departure from the city of New York, or from Boston," and this too, without losing a meal, or a night's rest.—*Chicago Democrat.*

NEW YORK CANAL TOLLS.

The following table shows the annual amount of receipts for tolls on the New York, Erie and Champlain Canals, and also the total receipts on all the New York State Canals, from January 1st, 1820, to January 1st, 1838.

Note.—In the total amount is included the receipts on the Erie, Champlain, Oswego, Cayuga, Seneca, Chemung, Crooked Lake and Chenango canals.—The tabular statement is from the Journal of Commerce.

Years.	Erie & Champlain canal,	Total receipts.
1820	5,437 34	5,437 34
1821	14,388 47	14,388 47
1822	64,072 40	64,072 40
1823	152,958 33	152,958 33
1824	340,761 07	340,761 07
1825	566,112 97	566,112 97
1826	762,003 69	762,003 69
1827	859,058 48	859,058 48
1828	835,407 28	838,444 69
1829	795,054 52	813,137 45
1830	1,032,599 13	1,056,922 12
1831	1,194,610 49	1,223,801 98
1832	1,195,804 23	1,229,483 47
1833	1,422,695 22	1,463,715 22
1834	1,294,649 66	1,339,799 56
1835	1,492,811 59	1,548,972 39
1836	1,556,269 37	1,614,680 38
1837	1,239,052 49	1,293,129 80
	$14,823,746 64	$15,191,879 86

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